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Self-reported measures of work satisfaction, receptivity towards organizational change, and ratings of quality management initiatives of campus facilities' workers in the state universities of Iowa

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Self-reported measures of work satisfaction, receptivity towards organizational change,
and ratings of quality management initiatives of campus facilities' workers in the
state universities of Iowa

by

Radhakrishnan Balamuralikrishna

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Industrial Education and Technology

Major Professor: John C. Dugger

Iowa State University

Ames, Iowa

1997

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ABSTRACT

Faced with increasing budgetary constraints, higher educational institutions across the United States are attempting to transform their organizational systems and processes. Quality management initiatives have become increasingly popular in several functions of universities and four-year colleges. In particular, campus facilities' departments have adopted total quality management (TQM) as the new philosophy.

The major purpose of this study was to develop an instrument to measure job satisfaction, receptivity towards organizational change, and ratings of quality management initiatives as perceived by custodial workers employed in university campus facilities. A secondary purpose was to determine existing perceptions of custodial workers employed by the three major state universities of Iowa. Establishing self-reported measures related to job satisfaction, receptivity towards change, and ratings of quality management initiatives was considered significant as organizational transformations were ongoing at these institutions.

The target population addressed included custodians employed in four different departments based at the University of Iowa, Iowa State University, and the University of Northern Iowa. In this study, the input of 370 custodial workers from the three institutions were usable for statistical analysis, yielding an 88% response rate from the target population. The final instrument used for data collection contained 55 items.

The reliability of the overall instrument was sufficiently high (0.88) for continued use in practical applications. Content validity as deemed by a knowledgeable panel of experts and construct validity as determined by a factor analysis, further demonstrated the usefulness

of the new instrument. Estimates of central tendencies related to work satisfaction, receptivity to change, and quality management practices of the custodial workers at the three institutions studied were somewhat neutral. The results suggested that there is a strong need for improving managerial practices at campus facilities.

As there was a strong positive correlation between work satisfaction and rating of quality management initiatives, the recommendations imply continued progress in the areas of top management's commitment to quality, empowerment of custodians, training related to continuous improvement, and customer orientation. Recommendations for further research include adding more relevant items to the proposed instrument and repeating the analysis by incorporating item discrimination techniques.

CHAPTER 1. INTRODUCTION

Progressive industries and business enterprises in the United States have rapidly initiated the implementation of quality management theories and practices in light of changes that have occurred in their competitive environment (Goodman et al., 1993; Sink, 1995). Organizations in all sectors of the economy continue to experience a need to deliver products and services of greater value to customers (Jacob, 1994). This often implies doing more with less, eliminating inefficiencies, and focusing on improved quality products and services offered at lower costs (McGee, & Tolchinsky, 1993). Factors such as continuously emerging technological innovations, growing global competition, and higher customer expectations continue to generate the sense of urgency required to foster organizational change during this final decade of the 20th century (Prahalad, 1990).

At the turn of the 20th century, noted economist Adam Smith and management scientist Frederick W. Taylor revolutionized the workplace with their ideas on work organization, job decomposition (work fragmentation), and job measurement (Juran, 1995a; Hammer & Champy, 1993). During the early 20th century, the methods of scientific management were successful in transforming then existing work environment and the job structure of individual workers. Manufacturing industries first embraced scientific management and subsequently, service industries followed these same principles (Lawton, 1993). The typical system as advocated by Taylor pervaded and characterized American business and industry through most of this century (cited in Janson, 1992/93). Historically,

managing by objectives (results) has also played a key role in shaping management attitudes in this country (Deming, 1986).

The high levels of productivity and profits attained by employing traditional management techniques (such as the principles of scientific management and management by objectives) was not a permanent solution to ensure continued success of American business and industry. Tough competition from industries around the world notably those based in Japan, matched American productivity and also excelled in quality (Garvin, 1988). Around the seventies, traditional American management practices were being seriously challenged by management experts. A new school of thought emerged in which scientific management was rendered obsolete and inappropriate for modern American business and industry (Drucker, 1991). The fundamental flaws of scientific management include its poor prescriptions for managing quality, and inability to respond aptly to dynamic, changing environments (Hammer & Champy, 1993). Management by objectives was criticized as a practice which among other things, adversely affected the quality of products and services delivered to the customers (Deming, 1986, Joiner, 1994).

Global competition during the 90s and beyond will have more to do with ideas rather than tangibles such as technology, resources, size, subsidies and investor pressures (Prahalad, 1990). Specifically, the systemic work barriers recognized to be detrimental to higher levels of individual worker achievement, received increasingly greater attention during the 1980's and 90's than ever before (Lawler, 1995). Changes proposed to traditional American management styles through modern approaches such as total quality management (TQM) and re-engineering focus largely on a single issue, namely, corporate culture (Rohm, 1992/93).

The literature describing the success stories of organizations that have reengineered to managing for quality is overwhelming. Reduced unit costs, larger profits, and increased productivity often appear as common denominators in these success stories, but the intangible results have found greater appeal in some quarters (Heath, 1994; Rohm, 1992/93). As seen in Table 1.1, changes in corporate culture are significant in renewed organizations.

Historically, the manufacturing sector has been the leader in changing organizational structures with the advancement of newer management theories, and service organizations have been the followers (Janson, 1993). In the United States, businesses in the services sector have experienced growth whereas manufacturing has declined. As they continued to

Table 1.1. Contrasting traditional and reengineered organizations (Rohm, 1992/93)

Traditional	Reengineered
Slow to react	Proactive
Cautious/conservative	Loose/flexible
Resists change	Capitalizes on change
Job-oriented	Team-oriented
Decisions pushed up	Decisions pushed down
Several management layers	Few management layers
Unquestioning/inhibitive	Questioning/sharing
Take no chances/make no mistakes	Take well-thought-out risks/correct mistakes
Closed communications	Open communications
Product-oriented	Customer-oriented
Think inward	Think outward
Sales emphasis	Marketing emphasis

grow, service companies in this country were generally recognized to be proactive in initiating and managing organizational changes to suit the dynamics of the business world (Bateson, 1989; Ginzberg & Vojta, 1981). Changes were necessary not only to succeed, but even to survive and manage to stay in business.

Service firms that continued to operate based on the philosophy of scientific management or management by results during the 1980's and 90's experienced a rapid proliferation of management levels accompanied by a loss of customer focus (Janson, 1993). The excessive division of labor created lengthy and complex work flow systems which resulted in a need for more supervisory staff. Consequently, service companies that became more functional also became more multi-layered and hierarchical, and culturally more bureaucratic (Hammer & Champy, 1993). Work simplification reduced the number of people within the organization who were directly involved with external customers. Besides providing a monotonous and boring job routine, traditional management approaches also created individual workers who held little or no accountability for their work. Quality suffered because workers were not motivated to take pride in their unwholesome work (Janson, 1993).

To remain competitive under the current existing market and global economy, service organizations realized the need to instill and foster a culture that would create employees with a strong focus towards exceeding the expectations of the customer (Lawton, 1993). Delivering superior quality products and services was recognized as a prerequisite for success, if not survival, for any organization in the 1990s and beyond (Parasuraman et al., 1988; Prahalad, 1990). The principles of quality management and re-engineering revolve

around undoing the harmful effects created by work fragmentation and over-specialization (Hammer & Champy, 1993). Instead of working towards internally generated organizational objectives, such quality initiatives demand an operation driven by customers' expectations of quality, innovation, responsiveness, convenience and flexibility (Janson, 1993).

Universities and colleges essentially provide higher educational services to students, industries, and other institutions within specific communities. Such educational institutions, particularly those in the public sector have goals and missions that are significantly different from those of corporations (Seymour, 1993). These differences however, do not preclude universities from the changing external environment. Higher education facilities have acknowledged the need to provide better quality services to the many varied customers they serve (Hubbard, 1994). In particular, the campus facilities' units based in higher educational institutions are striving to become more customer oriented through quality improvement initiatives (Reynolds, 1994a). Ironically, such units continue to experience significant financial cut-backs (Reynolds, 1994a). Challenged to provide better quality service with increasingly restrictive budgets, several facilities management divisions in universities and colleges have embarked on re-designing their work systems through quality initiatives such as empowering their employees to play more fulfilling roles, creating self directed work-teams, and promoting the motto of excellent customer service.

Rationale for the Study

Organizational change has emerged as a key issue in institutions of all kinds during the decades of the eighties and nineties. In particular, higher educational institutions from

both the private and public sectors, are planning or implementing fundamental changes in some or all aspects of their organization (Seymour, 1993; Stupak, 1993). Quality management philosophies, in particular, total quality management dictated the preferred directions for building new organizations in the higher education sector (Fain, 1991; Cornesky et al., 1992). There is a serious lack of reported objective measurements of the effects of organizational changes in public institutions, in particular, those associated with campus facilities management. This was recognized as a concern because significant resources are expended in such change efforts. The knowledge gained by individual units sponsoring organizational changes and subsequent dissemination of any new information to the general public is apparently outweighed by the expenditure of resources. Reversing this trend was recognized to be a step in the right direction.

Facilities management units based at the state universities of Iowa and elsewhere across the country could benefit themselves and other similar institutions by measuring the impact of their organizational change. Structural and cultural changes affect both people within the organization and the external customers served. Understanding the effects of such changes should be considered a long term proposition involving several years of planned observations and record keeping. It would be appropriate to assess the success of any job redesign by bench marking status prior to the introduction of changes, and then repeating the measure after implementation and practice (Ludeman, 1992). This data could be used later to substantiate or question any link between job redesign, employee attitudes and/or customer satisfaction (Ludeman, 1992).

The innovativeness or receptiveness to change of employees has been recognized to play a key role in the success of efforts to create any significant form of organizational change (Patchen, 1965; Price, 1972). Specific quality initiatives such as re-engineering, or break-through quality involve radical changes (Hammer & Champy, 1993; Parker, 1993). Current literature is also lacking in objective studies related to potentially important attitudinal measures such as innovativeness and attitude towards change of individual employees, and their relationship to the success of organizational change initiatives. This may be considered even more true of situations involving campus facilities in higher educational institutions.

One common dimension of facilities management organizations is that of custodial services. This area of operation lends itself to job redesign because many of the tasks completed by custodial workers are repetitive in nature, and involves direct and frequent contact with their customers. Three major public sector post-secondary institutions in the state of Iowa, namely Iowa State University, the University of Iowa and the University of Northern Iowa continue to employ more than 300 custodial workers combined. This number does not include those custodians who are employed by the residence hall facilities. At least one major state university in Iowa embarked on re-designing its custodial service operation, and quality initiatives were in progress at the other institutions. In particular, the institution planning the job redesign expressed a need to determine custodial workers' reaction prior to job redesign so that a benchmark was available for a long term job satisfaction/organizational climate research. Such detailed studies could also become potentially valuable records for similar campus facilities management departments based in other educational institutions.

Statement of the Problem

A survey of existing literature revealed the lack of objective measurements to substantiate the resources invested by higher education facilities management in re-engineering their processes through quality management initiatives. More specifically, psychometric instruments which are capable of quantifying the reactions of campus custodial workers to organizational change over a time frame of several years are yet to be developed. As modern quality management initiatives are employed in the workplace it is only rational that changing organizations attempt to conduct a longitudinal study in order to measure the effectiveness of the introduction of new ideas and concepts. Existing literature was also devoid of reports related to measures of individual custodial employee innovativeness and receptiveness to change even though such factors have been projected as key determinants of success in organizational change efforts. The development of attitudinal measures that are specific to campus custodial workers is crucial to managers of physical plants of universities based in Iowa and elsewhere in the United States.

Purpose of the Study

The primary purpose of this study was to create an instrument that would serve as a measure of custodial employee perceptions of their job and work environment (equivalently termed as custodial worker organizational reaction in the rest of this report), degree of receptivity to change of individual employees, and employee ratings of quality management initiatives that are prevalent in their organization

Additional purposes of the study were to:

1. To measure the organizational reaction of custodial workers at the public universities of Iowa, and thus establish a benchmark for measuring the impact of future organizational changes.
2. To measure the degree of custodial worker receptiveness to change at the public universities of Iowa, and thus establish a benchmark for measuring the impact of future organizational changes.
3. To measure the custodial workers ratings of the quality management initiatives that are prevalent in campus facilities management at the public universities of Iowa, and thus establish a benchmark for measuring the impact of future organizational changes.
4. To investigate corollaries including differences in custodial worker organizational reaction, receptivity to change, and ratings of quality management practices in their units as a function of the independent variables gender, level of education, age, and years of work experience at the current place of employment.

Research Questions

The questions addressed in this study were divided into two categories as (a) questions addressed by descriptive statistics, and (b) questions addressed by inferential statistics. The specific research questions of interest are stated in this section.

Questions addressed through descriptive statistics

1. What are the reliability and the validity of the paper and pencil instrument as a device to measure custodial worker organizational reaction, receptiveness to change, and ratings of quality management practice?

2. What is the organizational reaction of custodial workers employed in the three major state universities of Iowa?
3. What is the degree of receptiveness to change of custodial workers employed in the three major state universities of Iowa?
4. What is the custodial workers' rating of quality management practice within campus facilities units in the three major state universities of Iowa?

Questions addressed through inferential statistics

1. Are there significant differences in the index of organizational reactions between male and female custodial workers?
2. Are there significant differences in the receptiveness to change between male and female custodial workers?
3. Are there significant differences between male and female custodial worker ratings of quality management initiatives in their organization?
4. Are there significant differences in the organizational reaction of custodial workers as a function of the age of the employee?
5. Are there significant differences in the custodial worker receptiveness to change as a function of the age of the employee?
6. Are there significant differences in custodial worker ratings of quality management initiatives within their units as a function of employee age?
7. Are there significant differences in custodial worker organizational reaction as a function of the number of years of working experience in their particular units?

8. Are there significant differences in employee receptiveness to change as a function of the number of years of work experience in their respective units?
9. Are there significant differences in custodial workers rating of quality management initiatives prevailing in their organization as a function of the number of years of worked in the particular unit?
10. Are there significant differences in the organizational reaction of custodial workers as a function of their level of education?
11. Are there significant differences in the custodial worker receptiveness to change as a function of their level of education?
12. Are there significant differences in custodial worker ratings of quality management initiatives within their units as a function of their level of education?
13. Are there any relationships between the organizational reaction of the custodial workers and their ratings of quality management initiatives?

Procedure of the Study

One of the major tasks of this study was to develop an instrument specifically for measuring custodial workers' perceptions of their job and work environment. In addition, receptivity towards change, and precepts of quality management initiatives were to be included as constructs in developing the items comprising the instrument. The steps in completing the study were as follows:

1. The researcher performed a thorough review of the relevant literature.

2. An instrument was developed to measure custodial workers perception of their job and work environment organizational reaction, receptiveness to change, and ratings of quality management initiatives in their organization.
3. The instrument was reviewed for content and face validity by professionals with expertise in evaluation and/or involved in the maintenance activities carried out by physical plants in higher educational institutions.
4. A pilot test of the instrument was conducted using a representative sample of prospective respondents, and thus verified the readability and clarity of the instrument.
5. The procedures appropriate for surveying human subjects as required by the Graduate College were completed. Permission to execute the survey was subsequently obtained .
6. The instrument was administered on site at the University of Iowa, Iowa State University, and the University of Northern Iowa.
7. The responses to the items on the instrument were analyzed by applying descriptive, inferential, and data reduction statistical procedures.
8. Based on statistical evidence, the research hypotheses were tested and the research questions were addressed.
9. A final report of the study was prepared

Assumptions of the Study

The study was based on the following assumptions: (1) The subjects responded honestly to the survey instrument; (2) The respondents correctly understood the directions

and content of the instrument; and (3) The sample tested was representative of the entire target population.

Limitations of the Study

The study was confined to the three state universities in Iowa. Thus, the generalizability of the study would be limited to these universities and may not be strictly applicable to the custodial workers of campus facilities located in other state or private institutions. Also, contractual obligations did not permit the stratification of custodial workers' responses by individual institutions. Therefore, the findings reflect the overall perceptions of custodial workers in the three institutions combined.

Research Hypotheses

In order to ensure that the research questions requiring the use of inferential statistics would be answered in an objective manner, the following null hypotheses were proposed:

H₀(1a): There are no significant differences in the custodial worker's organizational reaction between male and female employees.

H₀(1b): There are no significant differences in the degree of receptiveness to change between male and female custodial workers.

H₀(1c): There are no significant differences in the employee rating of quality management initiatives between male and female custodial workers.

H₀(2a): There is no linear relationship between the custodial worker's organizational reaction and age of the employee.

H0(2b): There is no linear relationship between the custodial worker's receptivity to change and age of the employee.

H0(2c): There is no linear relationship between the custodial worker's ratings of quality management initiatives and age of the employee.

H0(3a): There is no linear relationship between the custodial worker's organizational reaction and the number of years of work experience at the current departmental unit.

H0(3b): There is no linear relationship between the custodial worker's receptivity to change and the number of years of work experience at the current departmental unit.

H0(3c): There is no linear relationship between the custodial worker's ratings of quality management initiatives and the number of years of work experience at the current departmental unit.

H0(4a): There is no linear relationship between the custodial worker's organizational reaction and the number of years of formal education completed by the individual.

H0(4b): There is no linear relationship between the custodial worker's receptivity to change and the number of years of formal education completed by the individual.

H0(4c): There is no linear relationship between a custodial worker's rating of quality management initiatives and the number of years of formal education completed by the individual.

H0(5): There is no linear relationship between the custodial worker's organizational reaction and ratings of quality management practice in the work place.

Definition of Terms

The following operational definitions were utilized in this study:

Change - something that is not constant but evolving; departure from a current existing situation.

Custodian - an individual who is responsible for maintaining building areas to be clean, safe, attractive, and comfortable (Willingham, 1990).

Departmental unit - formally established group of personnel responsible for a specific function in an organization.

Formal education - learning that has taken place when an individual enrolls in a school, two-year or four-year public or private college.

Innovativeness - first or early users of an idea among its set or similar social systems; finding new ways of doing things on the job (Patchen, 1965; Price, 1972).

Organizational reaction - attitudinal perceptions of workers toward their job and work environment (Cook et al., 1981).

Perception - an active or passive process that involves the conscious organization of incoming information; precedes decisions and actions (Kerr, 1982).

Quality management initiatives - new management philosophies that emphasize customer service, improving processes, team-work, and continuous improvement; management philosophies often referred to as total quality management in business literature

Receptivity - willingness to accept.

Reengineering - the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed (Hammer & Champy, 1993).

State university - a public sector post-secondary institution that confers four year college degrees

CHAPTER 2. REVIEW OF LITERATURE

This chapter contains major findings based on a study of the existing literature. As this study addressed the problem of developing an instrument to measure the reactions of campus facilities custodial workers to quality management-oriented organizational changes and investigate corollaries related to the individual degree of innovativeness, the topics surveyed included but were not limited to campus facilities management in higher education, managing for quality, innovativeness of individuals and measurement of specific attitudes.

Higher Educational Institutions as Complex Organizations

The United States continues to be recognized as a world leader in terms of offering opportunities for individuals to pursue higher education (Fonseca & Andrews, 1993). The presence of more than 3500 universities and colleges located all over the country has been documented in the literature (*Peterson's National College Databank*, 1990). Combined with community colleges, vocational and proprietary institutions, the opportunities for higher education are significant both in terms of depth of specialization and diversity of program offerings (*The College Blue Book*, 1995a, 1995b). In addition to the thousands of citizens who were enrolled in such higher educational institutions, the United States remains a world leader in terms of admitting foreign students for advanced studies (Blass, 1995; Wobbekind, 1989).

Higher educational institutions are complex organizations in several respects. They have annual budgets running to several millions of dollars (Seymour, 1993). Many institutions have organizational structures that are as complex as large corporations

(Seymour, 1993). Some of the nation's higher educational institutions such as the University of Minnesota, serve a student population as large as 60,000 in number (Fonseca & Andrews, 1993). In addition to instructional activities, universities generally value research and community outreach programs as central to their overall mission plan.

Academic versus Non-academic Functions of Universities

The core responsibility of academic institutions is to teach students and faculty personnel are most directly involved in this regard. However, student and faculty needs extend much beyond course related instruction (Seymour, 1993). Examples of other needs include reference material, quiet places for study, dining services, dormitories, recreational areas, health services, copy centers, computer systems, parking facilities, and clean public spaces. Supporting service departments such as libraries, cafeterias, residence halls, computational centers, public safety, and campus facilities have been established in order to meet the daily needs of students and faculty. The infrastructure of all higher educational institutions generally includes classrooms, laboratories, office spaces, rest-rooms, sports and recreational areas. Maintaining and improving available facilities continues to be a major agenda in higher educational institutions (Reynolds, 1994a). Watkins (1988) suggested that in many cases, campus facilities managers may oversee the operations equivalent to that of small cities in this country.

Function and Structure of Campus Facilities Departments

Facilities Planning and Management (FP&M) departments (also frequently referred to as Physical Plant or Campus Facilities) play an important role in enabling universities and

colleges to fulfill their primary academics oriented mission, goals and objectives. The main function of FP&M units is to provide classrooms, offices, and public spaces which are clean, safe, and maintained according to expected standards.

Campus facilities departments are usually headed by a director or general manager. Besides the head of the department, the management is generally comprised of managers and assistant managers at one or more levels. Supervisors, custodial workers and area mechanics form the non-managerial employees of a typical university based physical plant. Custodial workers and area mechanics are the front-line employees. The typical custodial worker performs cleaning duties, where as the area mechanic addresses tasks related to equipment maintenance, repairs and breakdown.

Organizational Change in University-based Physical Plants

In recent years several university-based physical plant units have re-evaluated their organizations in light of ever changing external influences such as population demographics and financial support (Reynolds, 1994a). There is general consensus among managers of physical plants that organizational changes are both necessary and promising (Apel, 1994; Hug, 1994; Yamane & Loope, 1994).

New challenges faced by campus facilities departments

Historically, land grant and other public sector institutions relied heavily on their state governments for financial resources (Hubbard, 1994; Pickett, 1994; Reynolds, 1994a). During the late 1980s and 90s, state and federal appropriations to several public universities dwindled due to significant budget cuts (Hug, 1994; Hubbard, 1994; Pickett, 1994). In other

cases, more funds were withdrawn from business units such as facilities planning, and reallocated to areas more central to the mission of higher educational institutions, that is, delivery of instruction (Apel, 1994; Hubbard, 1994). Towards the late 1980s and into the 1990s, the management of physical plant units continue to be challenged by at least three external forces identified as decreased budgets, expanding infrastructure on their campuses, and increased sophistication in terms of customer needs (Hug 1994; Reynolds, 1994a). The traditional approaches of scientific management or management by objectives were recognized as outdated and incapable of succeeding under the new constraints (Pickett, 1994). Future trends related to budgets for campus facilities were projected as being even more stringent (Reynolds, 1994a). Change became a necessity. Several campus facilities discovered that modern management theories that emphasize quality had a strong potential to successfully meet the new challenges (Reynolds, 1994a).

Alternative approaches for organizational change

Existing literature generally addressing the topic of organizational change and related issues is varied both in terms of depth and diversity. Numerous approaches for organizational change have emerged (Sink, 1995). Examples of the most recent ones include but are not limited to concurrent engineering, the Deming management method, high performance organizations, kaizen, reengineering, self-directed work teams, socio-technical systems design, time compression management, and total quality management (Axelrod, 1992; Cheser, 1994; Lytle, 1991; McGee & Tolchinsky, 1993; Lawler, 1995; Sheridan, 1990).

Total quality management (TQM) and re-engineering were recognized as the two most popular philosophies for organizational change in the 1990s (Villareal, 1995). These approaches, particularly TQM was favored in numerous higher educational campus facilities located all over this country (Reynolds, 1994a). The labels “TQM” and “reengineering” became prominently visible in the American literature related to organizational change during the late 1980s and 1990s. Of these two philosophies, TQM was the first to emerge as a popular approach in business circles. A comparative study of these two approaches will be presented later in this chapter.

Evolution of Total Quality Management

The complicated history of the evolution of modern TQM philosophy and the continuing contributions of numerous quality experts in its development are elaborately documented in business literature and are too numerous to cite. Marchese (1993) wrote:

To achieve its desired transformation, the Total Quality movement over time has gathered in loose union ideas from systems theory, humanistic and industrial psychology, management theory, human-resource and organizational development, statistical process control, plus lessons from earlier attempts at quality improvement like quality circles. All of these ideas in many guises and combinations, aim to remake organizations so they become more focused, disciplined, quick-footed, humane and competitive.
(p. 11)

Although TQM only recently emerged as a popular alternative management approach, the concept of managing for quality products and services was embedded in human civilizations several centuries ago (Garvin, 1988; Juran, 1995a). Numerous reliable references concerning the history of segments of quality, such as statistical process control, dimensional metrology and management exist, but a reasonably complete exposition of the evolution of managing

for quality has only recently become available (Juran, 1995a). The origin of managing for quality is frequently mistaken as a 20th century phenomenon (Juran, 1995a). Often, quality experts of the 20th century such as Shewhart, Deming, Juran, Ishikawa, or others are recognized as inventors of quality (cited in Juran, 1995a). Facts do not support such statements, and to the contrary, strong historical evidence has proven that the origin of managing for quality is as old as some of the ancient civilizations (Garvin 1988; Juran, 1995a).

Managing for quality prior to the Great Industrial Revolution

The concept of quality was recognized and applied even as early as the 8th century B.C. For example, ancient Chinese handicraft industry was organized into departments, one of which was specifically dedicated for the sole purpose of supervision and examination (Qiupeng et al., 1995). An ancient East Indian civilization has been credited for the creation of a document called Arthashastra, which dates back to the 4th century B.C. (cited in Goswamy, 1995). This book indicated among numerous rules and principles, there existed standards of quality control and customer satisfaction in regard to precious metals such as gold and silver (Goswamy, 1995). It was argued that the attempts made by people from ancient civilizations to develop measures and weights should be regarded as quality improvement initiatives (Juran, 1995a). Since the dawn of civilization, human beings developed an inclination for quality, but only recently it occupied center stage in business leadership and management (Garvin, 1988; Juran, 1995a)

Managing for quality in the Post Industrial Revolution Period

During its long history, managing for quality has endured long periods of relative stability and short periods of exploded interest (Juran, 1995a). Following the industrial revolution, interest in quality remained fairly stable until the Japanese quality revolution which actually began in the 1950s. Thus, it is appropriate to consider two different periods, the stable years prior to 1950 and the turbulent phase starting from 1950, in understanding quality management initiatives during the post industrial revolution era.

The Period: 1750-1950

The concept of statistical quality control as it exists today was not prevalent during the eighteenth and nineteenth centuries (Garvin 1988). Manufacturing and construction activities were executed by skilled workers who were mostly proud of their workmanship. Production volumes were small, assembled parts were matched to one another manually (selective assembly), and any inspection was done after the job was completed. The quality of goods produced depended on the skill and pride of the individual workers involved.

Towards the turn of the 19th century, Frederick Taylor proposed guidelines to improve the productivity of workers by breaking down a job into several tasks and creating specialist workers (cited in Drucker, 1991; cited in Hays, 1994). During this time, the demand for consumer goods far exceeded the supply potential. Productivity was the prime concern of entrepreneurs, and Taylor's ideas found quick appeal (Drucker, 1991; Garvin, 1988). As the principles for mass production were being continuously refined, the process of

inspection achieved an elevated status in 1903, when it was identified as one of the key tasks in effective shop management as follows:

The inspector is responsible for the quality of the work, and both the workmen and the speed bosses (who see that the proper cutting tools are used, that the work is properly driven, and that cuts are started in the right part of the piece) must see that the work is finished to suit him. This man can, of course, do his work best if he is a master of the art of finishing work both well and quickly. (Taylor, 1919, p. 101)

The practice of Taylor's scientific management hurt the pride of individual workers (Cheser, 1994; cited in Drucker, 1991). The works of Gilbreth and Mayo further desegregated workers from their management (cited in Drucker, 1991). Meanwhile productivity continued to rise in order to meet the ever increasing demand for both the simple essentials and the luxury goods. Organizational psychology flourished as one of the key subjects that addressed issues related to management theories. Maslow (1943) proposed a theory implying the existence of a hierarchy of needs which sought to explain how individual human beings were motivated. Briefly stated, this theory assumed that human beings were basically lazy, non-motivated and resisted change (Maslow, 1943, Shafritz & Ott, 1992).

The Period: 1950 - 1995

The growing disparity between workers and management following the practice of scientific management was acknowledged in the literature (Drucker, 1991). Few exceptions that prevailed were also identified in the literature (Drucker, 1991). For example, IBM's Thomas Watson was cited as an individual who understood the importance of nurturing management-worker relationships based on mutual trust and regard (Drucker, 1991). Fearing that tensions in management-worker relationships would rise to new heights in most

industries, behavioral scientists and managerial experts proposed more humanistic management approaches sometime during the 1950s (Drucker, 1991). The respect for the individual worker was most forcefully addressed in 1957 by McGregor in what continues to be regarded as a landmark publication, namely, *The human side of enterprise* (cited in Drucker, 1991; cited in Shafritz & Ott, 1992).

The more humanistic approaches of McGregor (1957) and others such as Drucker (1942) did not directly consider quality as a management concept. Productivity continued to be of great concern, and quality was still addressed largely through inspection. Better ways to manage quality were available through the statistical process control charts originally proposed by Shewhart (1931) or the sampling techniques of Dodge and Romig (1944), but only a handful of American enterprises paid any attention to these techniques (Garvin, 1988). Meanwhile, even as the industries in the United States were changing to more humanistic management approaches, Japan began a quality revolution starting around 1950 (Juran, 1978). This however, went unnoticed by most of the world including the United States until the early 1980s.

In the early 1980s, business leaders from the United States studied and reported the erosion and loss of the American competitive edge in the domestic and world markets (Garvin, 1984). Japanese industries were seizing the markets, attributed to better quality products offered at lower prices (Garvin, 1988). The study of the success of Japanese business and industry received a new impetus. Research indicated that the Japanese style of management had its roots in the United States (Drucker, 1991; Garvin, 1988). Further studies also revealed that much of the success of Japanese business and industry was a result

of their compliance with the management philosophy of American experts, most notably W. Edwards Deming (cited in Handfield, 1989). Improved focus on quality using statistical process control (SPC) and an increased emphasis on satisfying customers were the central themes of Deming's prescription to transform organizations for better business results. As a close associate of Walter Shewhart (who is widely regarded as a pioneer in applying statistical process control charts) at the AT & T Bell Laboratories, Deming realized the potential of SPC in enhancing the quality of manufactured goods and reducing waste (cited in Schilling, 1984).

The Deming Chain Reaction, as depicted in Figure 2.1, clearly explained the expected outcomes if quality was rendered the foremost priority (Deming, 1986; Joiner, 1994). The complete management philosophy of Deming was embodied in fourteen points, originally published in 1986 (Deming, 1986; Walton, 1986). Subsequently, these were modified and a refined list, as shown in Table 2.1, appeared in the literature (Johnson, 1993).

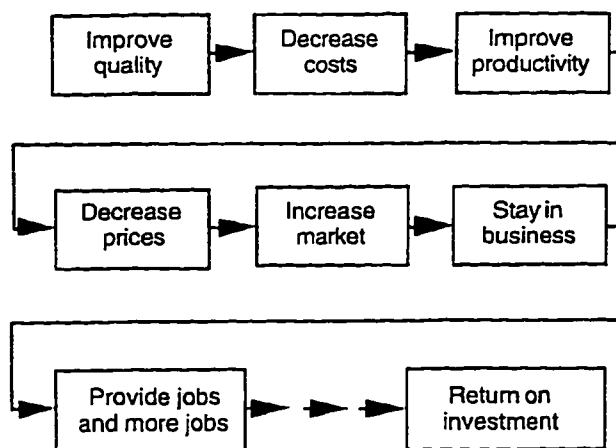


Figure 2.1. Deming's Chain Reaction

Table 2.1. Deming's fourteen points (Johnson, 1993, p. 49)

No.	Point
1.	Create and publish to all employees a statement of the aims and purposes of the company or other organization. The management must demonstrate constantly their commitment to this statement.
2.	Learn the new philosophy, top management and everybody.
3.	Understand the purpose of inspection, for improvement of processes and reduction of cost.
4.	End the process of awarding business on the basis of price tag alone.
5.	Improve constantly and forever the system of production and service.
6.	Institute training.
7.	Teach and institute leadership.
8.	Drive out fear. Create trust. Create climate for innovation.
9.	Optimize toward the aims and purposes of the company the efforts of teams, groups, staff areas.
10.	Eliminate exhortations of the work force.
11.	<ol style="list-style-type: none"> Eliminate numerical quotas for production. Instead, learn and institute methods for improvement. Eliminate MBO (Management by Objectives). Instead, learn the capabilities of processes, and how to improve them.
12.	Remove barriers that rob people of pride of ownership.
13.	Encourage education and self-improvement for everyone.
14.	Take action to accomplish the transformation.

These ideas of Deming may be regarded as the single most important contribution to the development of TQM as a modern management philosophy.

In general, business leaders of the United States realized that quality was incorporated as a strategic business policy in the highly successful Japanese firms (Garvin, 1988). There were two striking differences between the Japanese style of management versus that of the United States:

1. Japanese management focused more on their processes as opposed to their counterparts in the United States who focused on managing by results: and

2. Japanese companies were market driven whereas their American counterparts were interested in obtaining higher yields in production.

Johansson et al. (1993) described the differences between Japanese and Western management business practices. As shown in Figure 2.2, Japanese firms were more process and market driven than other industrialized countries by at least a decade.

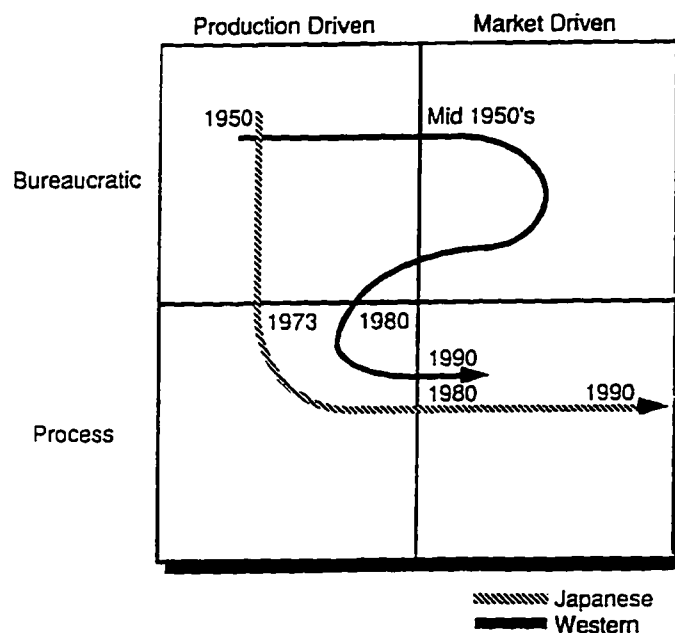


Figure 2.2. A comparison between Japanese and Western management styles

The evolution of quality as the most fundamental management concept was summarized by experts in quite different ways. For example, Garvin (1988) proposed a model in which quality emerged as a strategic business concept only in the 1980s (Seymour, 1993). According to this model, the United States experienced four quality “eras” as shown in Table 2.2. Yet another expert describes managing for quality as a fourth generation

Table 2.2. The four major quality eras (Seymour, 1993, p. 9)

Identifying Characteristics	Inspection (pre 1930s)	Statistical Quality Control (1930s-1950s)	Quality Assurance	Strategic Quality Management (1980s-1990s)
Primary concern	detection	control	coordination	strategic impact
View of quality	problem to be solved	problem to be solved	problem to be solved, but one that is attacked proactively	competitive opportunity
Emphasis	product uniformity	product uniformity with reduced inspection	the entire production chain, and the contribution of all functional groups, to preventing quality failures	market and consumer needs
Methods	gauging and measurement	statistical tools and techniques	programs and systems	strategic planning, goal-setting, and mobilizing the organization
Who has responsibility for quality	inspection department	manufacturing and engineering departments	all departments, although top management is only peripherally involved	everyone in the organization, with top management exercising strong leadership
Orientation and approach	"inspects in" quality	"controls in" quality	"builds in" quality	"manages in" quality

management theory (Joiner 1994). These four generations of management are briefly elaborated in Table 2.3. Clearly, quality is projected as a central theme in the most evolved management philosophy.

Although quality was incorporated as a strategic management concept in numerous organizations, its potential continued to remain largely unrealized due to a lack of complete and universal understanding. Juran (1995b) hailed the 20th century as the "Century of Productivity" and predicted that the 21st century would become the "Century of Quality" (p. xii).

Table 2.3. The four generations of management (based on Joiner, 1994)

Generation	Description	Action
1 st	Management by doing	"Don't worry. I'll take care of it."
2 nd	Management by directing	Master craftsperson gives detailed directions to apprentices: "Here, let me show you how this can be done."
3 rd	Management by results	"Okay, reduce inventories by 20% this year and I'll reward you or punish you based on how well you do. Good luck!"
4 th	Threefold integrated concept embracing quality, scientific approach, and teamwork	"What do my customer's want? How can I help my employees serve our customers better?"

Business Process Reengineering

Business Process Reengineering (BPR) was first proposed by Hammer and Champy (1993) during the late 1980s. It gained significant prominence in the year 1990, and since then has progressively emerged as an important topic in present day business circles (Vogl, 1993). The status of BPR was summarized by Settles (1993) as:

There exists a diversity of opinions regarding the pros and cons of re-engineering. On one hand experts believe that it will be the savior of American business and industry by improving productivity in quantum leaps, and on the other there are concerns that it will eliminate jobs and increase unemployment. Again, there are some who claim that re-engineering is a totally new concept touching business circles, and there are others who say that it is just an extension of the relatively old philosophy of continuous quality improvement or total quality management. (p. ix)

Definition and fundamental concepts

Technically, the term reengineering means starting over, and completely rethinking the way in which a process is accomplished. Several definitions have appeared in the literature. Reengineering was defined by Parker (1993) as: "Business process re-engineering

is the use of evolutionary tools/techniques combined with enabling technologies to provide an explosive mix to make dramatic change throughout the organization and to deliver what the customer requires” (p. 145).

The preceding definition of BPR is closely similar to the most original version proposed by Hammer and Champy (1993): “. . . the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed” (p. 31).

Hammer and Champy (1993) explained the presence of four key words in their conceptual definition of reengineering. The word “fundamental” implies that reengineering involves answering basic questions about the individual firm such as the reason behind the firm doing what it does, and why does it do things in a particular way. Such fundamental thinking usually sheds some light on the inherent underlying assumptions of the firm. Often, these basic assumptions could be erroneous and are to be blamed for poor business results (Hammer & Champy, 1993). As an example, a company seeking to improve the efficiency of customer credit checks should determine whether credit checks are even necessary in the first place. Otherwise an underlying assumption was made that a credit check is necessary and this did not represent a true understanding of reengineering.

The second key word, radical, originates from the Latin word “radix”, meaning root. Reengineering implies getting to the root of things. It also demands complete disregard for the old structures and procedures, and a focus on discovering totally new ways of achieving business objectives. Reengineering involves total re-invention of the business and does not just address improvement, enhancement, or modification issues (Hammer & Champy, 1993).

The third key word is denoted as “dramatic”. This implies that reengineering is aimed at achieving quantum leaps in performance (Ehresman, 1995). In contrast to the goals of a continuous quality improvement where the focus presumably is on marginal gains, the goals of a reengineering program are to achieve dramatic increases in performance levels. Hammer & Champy (1993) reported that there are three broad categories of firms that would typically be interested in dramatic improvements in performance as opposed to smaller scale results. Firms in the first category include the ones that are totally broke and on the brink of collapse. Continuous improvement would be insufficient to keep such a firm in business. The second category of firms is those that perform reasonably well, but are just beginning to face new threats from competitors. Last, the third category of firms is those who stand out clearly as leaders, but who would like to strengthen their position even further.

The fourth keyword in the formal definition of reengineering is identified as “processes”. Hammer and Champy indicated that this is the most important part facet of reengineering. The emphasis of reengineering is not on individual tasks, jobs, people, or organizational structures. Instead, the focus is on the improvement of processes (Hammer & Champy, 1993).

The promise of reengineering

Business enterprises of all kinds have a potential to reap the benefits of reengineering (Vogl, 1993). The concepts of reengineering have existed for more than a decade before they were distinctly recognized (Hammer & Champy, 1993). The literature contains numerous

success stories of firms that have recently employed re-engineering. A brief description of a few examples from different parts of the service sector was considered noteworthy.

As early as in 1979, IBM reviewed the usage of information technology in its accounting function (Andros et al., 1992). The company had as many as 315 separate systems worldwide supporting the six basic accounting functions of general ledger, fixed assets, U.S. transactions, worldwide transactions, accounts receivable, and accounts payable.

This system posed three major problems to corporate executives:

- Not capable of responding quickly to the company's changing information systems.
- Financial information could not be consolidated with cost effectiveness.
- Redundancy in the systems made developing and maintaining them expensive.

IBM reengineered its accounting organization with the help of information technology by developing a global set of common accounting systems called Andros. This “common systems” approach consolidated and standardized many different systems into a limited set of applications for each of the basic accounting functions. IBM adopted this approach for over a decade and by 1991, the number of systems experienced an almost tenfold decrease, from 315 to 36 (Andros et al., 1993). As a result of these reengineering efforts, the company was able to downsize its accounting employee work force by approximately 20%. The worldwide revenues rose by 300% and the internal rate of return on the investment in common systems was an impressive 19%. IBM was able to re-engineer their processes so they could continually improve the way goods and services were delivered. They were also able to implement company-wide decision making which is considered essential to successfully competing in a modern business environment. Surveys following

the implementation showed that customer satisfaction rates were in the 85-90% range. and cycle times were reduced by 65-70%.

Sirkin and Stalk (1990) provided a case study of a process redesign in a paper mill which was on the verge of bankruptcy in the year 1983, and losing more than one million dollars per month. This company went through major reform and their key to success was attributed to a multi-year learning process in which employees developed four problem solving loops, with each succeeding loop increasing in complexity and sophistication. The loops were identified as fix-as-fail, prevention, finding root causes and anticipation. As a result of redesigning its processes, the paper mill recovered as a break-even operation within a year, and by 1989, the earnings per share for the entire company tripled, and the price per share increased ten times over the dollar figures of 1983 (Sirkin & Stalk, 1990). Managers and workers learned to take the initiative not just for identifying problems, but also for improving processes, for fixing problems, and enhancing the quality of products.

Service organizations such as commercial banks have aggressively pursued their search for the best strategic direction and organizational design to achieve their business objectives. The First National Bank of Chicago tested and refined innovative methods for re-engineering (Spadaford, 1992/93). Although the bank had a long tradition of caring about customers and looking for their best interests, during the mid 1980s, its commercial loan support process experienced many service problems and unhappy customers. Some key reasons cited for these undesired outcomes were:

- The fragmented work processes were not truly designed to the business which was growing in volume and complexity.

- Employee morale was relatively low as the work system did not foster a sense of accomplishment.
- The work flows followed a typical assembly line system of operation involving multiple hand-offs on different floors and created a barrier for of accountability.

In reengineering their operations, the key strategy was to design a service job that would give customers and internal clients one-stop shopping for their needs. Front-line service personnel were given total responsibility regarding all aspects of commercial loan servicing. This included dealing with customers, processing loan transactions, and resolving errors. The front-line personnel were trained using a work effectiveness model and the so called “work-station professionals” were created. Besides the job itself, major processes within these jobs were altered and new, easy-to-use technology was made available to the work-station professionals.

As a result of business process reengineering, there was a significant improvement in efficiency, lower costs, and enhanced job content for individual employees. Dramatic improvements in performance were observed, and it was reported that the cycle time moved from four hours to fifteen minutes, with improved controls and accountability (Spadaford, 1992/93).

Numerous other success stories such as the ones just cited are documented in the literature (Institute of Industrial Engineers, 1993). The significant advantages gained by radical changes as opposed to continuous improvement have been recognized and realized by a large sector of business and industry. University-based facilities management divisions that are desirous of dramatic changes in the level of intended outcomes should consider the concept of re-engineering as a potential means to achieve their desired future business results.

TQM versus reengineering

The proponents of reengineering have attempted to distinguish and distance their philosophy apart from TQM (Hammer & Champy, 1993). On the other hand, reengineering is often regarded as a unique quality initiative existing within the realm of TQM. Ehresman (1995) wrote: “Continuous process improvement, a long-time staple of total quality management, and process re-engineering, one of total quality management’s newest topics. are two separate but complementary methods for improvement” (p. 134).

Business Process Reengineering was identified as one of three process oriented philosophies, the other two being TQM and Just-In-Time (JIT) manufacturing. (Johansson et al., 1993). The authors further observed (it was noted that the phrase “close relative” in their quote was in reference to TQM):

Business Process Engineering (BPR), although a close relative, seeks radical rather than merely continuous improvement. It escalates the efforts of JIT and TQM to make process orientation a strategic tool and a core competence of the organization. BPR concentrates on core business processes, and uses the specific techniques within the JIT and TQM “toolboxes” as enablers, while broadening the process vision. (p. 6)

The preceding observations suggest that pro-business process engineering advocates questioned the limitations of continuous improvement, and not TQM in its entirety (McGee & Tolchinsky, 1993; Rosenfield, 1994). Jacob (1993) maintains that reengineering is closely associated with total quality management. BPR experts have also concluded that continuous improvement is a necessary ingredient in fine-tuning a reengineered process (Ehresman, 1995). Based on these findings, it is reasonable to assume that reengineering is yet another

significant contribution to the body of knowledge related to the quality management theories. including total quality management.

Quality as a Strategic Concept in Transformed Organizations

By and large, the manufacturing and production-related industries were quick to discover the potential of quality based management philosophies (Shetty, 1987). Statistical process control (SPC) originated in the United States around 1930, but was largely ignored until the early eighties, and found its way back through the teachings of Deming, Juran. Crosby and others. Quality management was recognized as a key element in the popular. integrated approach known as World Class Manufacturing (Flynn, 1994; Schoenberger 1986).

Significant use of mechanized methods in the production of nearly all types of manufactured goods lead to increased productivity in the United States. The typical factory worker in this country was described to be one of the most productive in the entire world. Increased productivity lead to a manufacturing base which experienced a continued decline in workforce as a percentage of the total population. Simultaneously, the services sector of the economy absorbed most or all of the jobs lost in production. During the 1980s and 1990s, management specialists in the United States continue to be challenged to tailor quality management techniques for application in the services sector of the economy.

Understanding service quality

The proportion of the working U.S. population employed in the service sector increased from 30% in 1900 to 74% in 1984 (Bateson. 1989). Another study reported that

85% of all new jobs created since 1982 were in the service industries, and projected future increases in this percentage figure (Koepp, 1987). The phenomenal growth of jobs in this sector is reflected in other parts of the globe as well because service industries account for approximately 60% of the total worldwide gross national product (Bateson, 1989).

Quality management initiatives were only recently recognized as potential strengths by service providers. For example, Deming (1981/82) wrote: “Eventually, quality control will assist not only the production of goods and food but the service industries as well—hospitals, hotels, transportation, wholesale and retail establishments, perhaps even the U.S. mail” (p. 16).

Improved quality of the specific service provided continues to be increasingly proposed as the key strategy to a business firm’s competitive edge (Brown & Swartz, 1989; Cronin & Taylor, 1992; Parasuraman et al., 1988; Quality Focus Institute Staff, 1991). In fact, professionals in management regarded service quality as one of the most serious problems facing business and industry (Drucker, 1991). Also, administrators in higher education expected that rendering quality service would be one of the most serious challenges they would face during the nineties (Seymour, 1993).

There are wide variations in a conceptual understanding of service quality, and it has been described as a construct that eludes a universally acceptable definition (Brown & Swartz, 1989; Carman, 1990; Parasuraman et al., 1988, 1991; Webster, 1990). This was recognized as an easily acceptable premise because the term “quality” itself lacked a unique definition (Crosby, 1979; Garvin, 1988). However, recent research has seriously attempted to address some of the factors underlying a description of service quality. Through a series

of iterative studies that extended over a period of seven years, Parasuraman et al. (1991) discovered that service quality may be construed as a concept involving five dimensions stated as reliability, tangibility, responsiveness, assurance, and service. Seymour (1993) has basically adapted an older version of this model to reflect the service quality requirements of higher educational establishments as shown in Table 2.4. Further, there is strong empirical evidence to suggest that perceived service quality is not determined based on the absolute ratings on the dimensions contained; rather it is obtained by measuring the relative difference between the expected and perceived levels of service (Seymour, 1993) as depicted in Figure 2.3. In order to create a positive perception of service quality, it is necessary to meet or exceed the expectations of the customers in as many dimensions as possible.

Table 2.4. Dimensions of service quality (Seymore, 1993, p. 130)

Dimensions	Higher Education Application
ACCESS involves approachability and ease of contact	<ul style="list-style-type: none"> • maintaining customer-driven office hours • providing an efficient telephone system
COMMUNICATION means keeping customers informed	<ul style="list-style-type: none"> • explaining services/costs, and vision • assuring the customer of intentions
COMPETENCE means possession of the required skills/knowledge	<ul style="list-style-type: none"> • demonstrating teaching excellence • developing research capabilities
COURTESY involves politeness, respect, consideration	<ul style="list-style-type: none"> • treating students with dignity • insisting on equal treatment for all
CREDIBILITY includes honesty, trustworthiness, believability	<ul style="list-style-type: none"> • delivering on recruiting promises • having fair and reasonable policies
RELIABILITY involves consistency of performance and dependability	<ul style="list-style-type: none"> • getting rid of incompetent employees • reducing registration/billing errors
RESPONSIVENESS concerns the readiness to provide the service	<ul style="list-style-type: none"> • returning telephone calls promptly • providing timely resolution of complaints
SECURITY is the freedom from danger, risk, or doubt	<ul style="list-style-type: none"> • assuring physical safety • protecting individuals' privacy
TANGIBLES include the physical evidence of the service	<ul style="list-style-type: none"> • maintaining campus grounds • acquiring appropriate technology
KNOWING THE CUSTOMER means making the effort to understand	<ul style="list-style-type: none"> • providing individualized attention • developing the means to "listen"

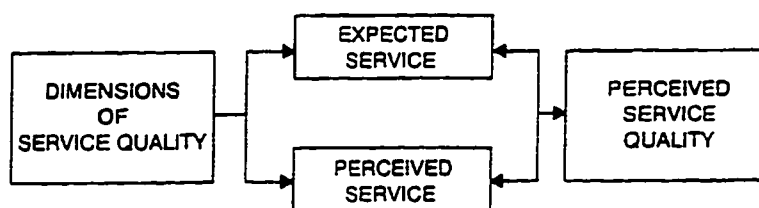


Figure 2.3. Service satisfaction (Seymore, 1993, p. 131)

Lawton (1993) maintains that service has all the attributes of a typical product, that is, it is measurable, countable and deliverable. In the context of facilities management in higher education this could mean clean office spaces or classrooms, a specification, an estimate, an answer or emptying a trash basket (Reynolds, 1994b).

Worker innovativeness as a factor in organizational change

Towards the 1970s, even as humanistic approaches were gradually replacing the ideals of scientific management in industry, researchers were curiously studying specific behaviors of individual workers in a changing work environment (Cook et al., 1981). Psychometric literature identified innovation as a construct, and defined it as “the degree to which a social system is a first or early user of an idea among its set of similar social systems” (Price, 1972, p.118). More specifically related to the duties of typical blue-collar employees, a new construct called “work innovation” was defined by Patchen as “finding new ways of doing things on the job” (cited in Price, 1972, p.118). The same author also conceived a dimension, “acceptance of job changes,” which was originally discussed as follows:

In an era of swift technological and administrative changes, the degree of employee acceptance versus resistance to change is of considerable importance to managers. From the stand-point of individual well-being, general resistance to change may also be important in that it may indicate that the person feels threatened by the change in some way. It seems desirable therefore to be able to assess the extent to which employees react favorably or unfavorably to changes in the job situation. (p. 120)

These conceptualizations of work innovation and acceptance of job changes were recognized as potential measures of the campus facilities custodial worker's innovativeness and willingness to accept organizational change.

The importance of individual worker innovativeness in quality managed organizations was accorded an elevated status when the eighth point of the original Deming 14-point philosophy was modified as follows: "Drive out fear. Create trust. Create a climate for innovation" (cited in Johnson, 1993, p. 49).

Innovation is a powerful characteristic that is capable of generating new and improved services (Deming, 1981/82). The essence and positive advantages of fostering a climate conducive to employee innovativeness was evident in previous research studies (Deshpande, 1993; Van-Auken, 1992). The concept of individual innovativeness, its characterization and measurement has been addressed quite elaborately in business marketing literature, particularly consumer behavior research (Rogers, 1983). Although the individual degree of worker innovativeness was projected as an important element in changing organizations, there is little evidence of psychometric measurement-related research contributions in this regard (Orpen, 1990; Webster, 1990). Organizations must strive to foster innovativeness among its affiliates in order to succeed in modern business environment (Simmerman, 1994).

Importance of evaluation

Creating and sustaining changes in any organization has been recognized as a significant cost-incurring proposition. Resources in terms of human efforts, dollars, and infrastructure are typically expended (Seymour, 1993). Consequently, an increasing number of organizations demonstrated considerable interest in evaluating the outcomes of their change efforts (Whiting, 1992). Chief Executive Officers (CEOs) of companies and institutions realize that managing by fact is superior to managing by intuition (Desatnick, 1992; Zangwill, 1994). A growing number of CEOs endorse the idea that “nothing improves until it is measured, and as soon as something is measured, it automatically begins to improve” (Ludeman, 1992, p. 52). The nation’s most prestigious honor for quality, the Baldrige award, strongly emphasizes measurement and evaluation of systems, processes, and stakeholders (Desatnick, 1992).

As quality management initiatives place heavy emphasis on satisfying the end users of a product or service, customer surveys have gained immense popularity (Babich, 1992). In fact, such surveys were identified as the single most large source of revenue for business consultants in recent times (Futrell, 1994; Hayslip, 1994; Whiting, 1992). Customer surveys have several strengths as a valid measure of organizational efforts, but they also suffer from a serious drawback. As end-users, customers are not usually in a position to recognize shorter term impacts of organizational change.

Total Quality Management is regarded as a slower change process, often involving a period of five years or more. It could be futile for an organization to expend efforts over such long periods of time without any evidence of signs of positive results. Recent trends have

included surveying the work force and capturing their perceptions of success or failure as a result of any new differences that were introduced in the work place (Ludeman, 1992; Rolletson, 1991). Such studies have typically involved the use of a written questionnaire for benchmarking status prior to the change, and administering an identical instrument afterwards. In this manner, management was able to obtain crucial feedback concerning the impact of change, and this was done in a shorter time frame than what would normally be admissible for a customer survey to be generally valid (Ludeman, 1992). Yet another important reason for seeking employee input addresses one of the fourteen tenets in Deming's philosophy for management, namely, drive out fear from the place of work (Deming, 1986; Kivenko, 1994).

Although quantitative correlational studies between employee and customer perceptions of changed organizations are virtually lacking in the literature, the few available reports suggested that employee reactions and customer satisfaction perceptions are not mutually exclusive. To the contrary, employees' positive feelings about their job and work environment was regarded as a precursor to customer satisfaction (Gulledge, 1991; Kohnke, 1990; Myers, 1994; Schlesinger et al., 1991; Schmit & Allscheid, 1995; Tompkins, 1992; Tornow & Wiley, 1991; Weaver, 1994; Wiley, 1991). Additionally, the concept of satisfying the internal customer, that is people within a particular organization, has gained significant importance as a quality management precept. In light of these findings, it is reasonable and logically sound to verify employee reactions to organizational change, and use these as valuable measures in order to initiate corrective actions during the organizational transformation process.

Review of Selected Related Measures

As the major focus of this study was to develop an instrument addressing the areas of custodial workers' perceptions of their organizations, receptivity towards change as demonstrated by their individual degree of innovativeness, and ratings of quality management initiatives, the review of literature focused on existing related measures. This section provides a brief review of selected psychometric studies that have been published.

Measures of employee perceptions of their job and work environment

Historically, researchers have demonstrated a keen interest in developing psychometric instruments to gather the perceptions of employees. in particular, those construed as affecting job satisfaction and organizational climate (Cook et al., 1981). Numerous instruments have been proposed in order to measure both overall job satisfaction and other specific satisfactions. Figure 2.4 summarizes various job features (dimensions) that are covered by some of the popular measures identified in the literature. An analysis of the job features included suggests that, with the exceptions of the dimensions of continuous improvement and customer philosophy precepts of quality management initiatives, existing instruments provide a theoretical framework and strong basis for measuring employee perceptions of their organization.

Measures of individual degree of innovativeness and attitude towards change

Innovativeness has been identified as a construct that does not enjoy a universally acceptable definition (Goldsmith, 1986). Various researchers have operationalized this construct differently and a number of psychometric instrument measures are available.

Consumer behavior research has focused much attention on measuring the innovativeness of individuals (Rogers, 1983; Venkatraman, 1994). In addition to considering innovativeness in a general sense, specific types of innovation have been proposed and defined. These specific types include use, product category, cognitive and sensory innovativeness (Goldsmith & Hofacker, 1991; Price & Ridgeway, 1983; Venkatraman & Price, 1990) .

The most prominent measures of the individual degree of general innovativeness have been identified in recent studies (Huang, 1993):

1. The Open Processing Scale (OPS) (Leavitt & Walton, 1975; 1988)
2. Innovativeness Scale (Hurt, Joseph, & Cook, 1977)
3. Jackson Innovation Inventory (Jackson, 1976)
4. Kirton Adoption-Innovation Inventory (KAI) (Kirton, 1976)

The number of items in the four instruments cited above varied from 20 to 32, and responses were sought on either a Likert interval scale or a true/false format.

A specific type of innovation which is particularly interesting in the context of custodial employees working in campus facilities units was addressed by Patchen (1965). Labeled as work innovation, this construct was defined as “finding new ways of doing things on the job.” A six-item instrument based on a Likert interval scale format was designed to measure work innovation and this instrument has received positive comments for its high reliability and validity (Price, 1972). An associated five-item instrument projected to measure employee “acceptance of job changes” was also included along with the previously cited innovativeness scale (Patchen, 1965; Price, 1972).

	Number of items	Supervision	The company	Co-workers	Working conditions	Career progress	Promotion prospects	Pay	Subordinates	Job security	General extrinsic	Kind of work	Amount of work	Personal growth	General intrinsic	Others
Index of Organizational Reactions	42	x	x	x	x		x	x			x	x				
Need Satisfaction Questionnaire	13			x					x					x		x
Job Descriptive Index	72	x	x			x	x				x					
Managerial Opinion Scale	77	x	x	x		x	x	x			x					
Worker Opinion Survey	92	x	x	x		x	x				x					
Specific Satisfaction	14	x		x			x		x				x			
Facet-specific Satisfaction	33	x		x	x		x	x				x	x			
Intrinsic and Extrinsic Rewards	7									x					x	
Social Rewards Satisfaction	3			x												
Pay Satisfaction	3							x								
Job Expectations	28					x	x		x	x		x	x			x
Company Satisfaction	12		x													
Company Satisfaction	20		x													
Triple Audit	112	x	x	x		x	x	x	x	x		x	x			x
Achievement Satisfaction	4					x										
Career Dissatisfaction	35					x										
Content and Context Satisfaction	36									x					x	
Motivator-Hygiene Attribution	12									x					x	
Role Orientation Index	25	x		x				x							x	
Attitude toward Flexitime	18															x
Job Satisfaction Questionnaire	33	x		x		x	x				x					
Job Satisfaction Scale	25	x		x			x		x		x		x	x		
Satisfaction with Rewards	19			x			x		x				x	x		
Subordinate Evaluation Questionnaire	20							x								
Morale Scales	299	x		x	x			x			x		x			x
Union Satisfaction	6															x
Union Attitude Questionnaire	77															x
ERG Satisfaction	35	x		x	x		x						x			x
Information System Satisfaction	57															x
Minnesota Satisfaction Questionnaire	20									x					x	
Overall Job Satisfaction	15									x					x	

Figure 2.4. Summary of job dimensions covered by prominent job satisfaction instruments (Cook et al., 1981, p. 46)

Measures of the major precepts of quality management

Studies aimed at establishing the underlying concepts of quality management using a psychometric approach are largely restricted to a total quality management approach. The topic of reengineering has not received this kind of attention. The philosophy of total quality

management has been explained simplistically using as few as three major factors/dimensions. In other situations, the philosophy has been dissected into several key components. The Malcolm Baldrige award criteria have been widely applied by researchers as a conceptual framework to derive TQM-related psychometric measures from a practical viewpoint (Lord, 1994; Moser, 1992). However, there is no single study that has established universal agreement as to what constitutes TQM (Anderson et al., 1994).

There exist but very few studies which are complete in exploring what constituted TQM. The incomplete studies are often statistically deficient, that is, reliability and/or validity analysis are not included. Among the first of studies which reported a detailed analysis, Saraph et al. (1989) identified eight critical factors of quality management:

- Role of top management and overall quality policy
- Role of the quality department
- Training
- Product/Service design
- Supplier quality management
- Process management
- Quality data and reporting
- Employee relations

It was noted that although customer involvement did not appear directly as a factor in the above model, the authors implied that aspect in their construct of product/service design. Also, the above study was not industry specific, that is, the identified factors were projected to be valid for situations encompassing either service or manufacturing oriented firms.

Detailed psychometric studies that have recently emerged consider TQM from the perspective of manufacturing industries (Flynn et al., 1994; Hong, 1993; Pascoe, 1992).

Bryce (1991) postulated TQM programs as comprising of four key components:

1. Customer satisfaction
2. Top management commitment/leadership
3. Continuous improvement
4. Employee involvement and empowerment

The above theory was confirmed in a designed study conducted by Pascoe (1992), thus lending support to the characterization of TQM as a four-dimensional construct. Based on a qualitative synthesis of expert opinions related to total quality management, and analyzing from the perspective of higher educational campus facilities. Reynolds (1994b) proposed six core premises of TQM listed as:

1. Become customer-centered
2. Provide leadership
3. Improved communication
4. Continuous Improvement
5. Ensure accountability
6. Create a quality work environment

It was concluded that the breakdown of quality management initiatives into its constituent components for the purposes of constructing an attitudinal measurement scale could be judgmental within the wide variations that prevail based on existing literature. The commonalities that exist among the various theoretical models which attempt to describe TQM are yet to be uniquely identified and established with rigor.

Summary

Higher educational institutions, particularly those in the public sector, are continually being challenged to increase productivity and the quality of their services. The non academic components of universities, such as facilities planning and management, are often the first ones to be seriously affected by budget cuts in terms of financial crisis (Hubbard, 1994).

Also, inefficiencies in physical plant operations, particularly custodial services, have forced some universities to delegate this function to sources external to the university (Hubbard, 1994). The top management of several university physical plants have realized that, in order to create effective and efficient custodial services departments, organizational changes are necessary (Reynolds, 1994c).

Total quality management, coupled with the more recent concept of reengineering, has a strong potential to simultaneously enhance the productivity and quality of custodial services. Several physical plants have implemented the total quality approach in custodial operations, but there is a serious lack of a quantified understanding of the effectiveness of the new philosophy. One popular approach that has reemerged in organizational measurement is the concept of seeking self-reported measures of employee perceptions of their job and work environment (Ludeman, 1992). The primary reason behind organizations favoring this approach is that employee satisfaction is a precursor to achieving one of the major goals of quality managed companies, that is, customer satisfaction. Managers of custodial services departments have realized the importance of employee feedback in improving the quality of service to customers (Reynolds, 1994c).

Organizational measurement has a reasonably rich history, therefore, numerous measures of employee satisfaction are already available. These measures will require some modification in the context of university custodial departments changing to quality-managed organizations. It is reasonable to assume that the custodial workers' receptivity to embrace new ideas would be a key determinant of success of any change efforts. Hence, specific measures are required to verify the innovativeness and attitude towards change of custodial

workers. Recent research has focused attention to synthesize the elaborate concepts underlying the total quality management philosophy into its constituent elements. One popular idea suggests that total quality management contains four essential elements, identified as top management commitment, continuous improvement, employee empowerment, and customer orientation.

CHAPTER 3. METHODOLOGY

This chapter describes the method and important procedures used in conducting the study. The nature of the study could be best described as descriptive and employing survey techniques. This chapter is divided into the following sections: Definitions of Population and Sample; Variables of the Study; Development of the Instrument; Procedures for Data Collection; and Statistical Analysis of the Data.

Definitions of Population and Sample

The population targeted in this study was a group of custodial workers employed by Iowa State University, the University of Iowa, and the University of Northern Iowa. The implementation of quality management initiatives at the three institutions was at the beginning stages. All employees belonging to the target population were extended the opportunity to provide their input as part of the data collection. However, some small numbers were lost due to absences, and even fewer due to non-compliance with instructions which adversely affected the inclusion of their input during data analysis. The number of custodial workers that were expected to take part in this study, the actual turnout, and the number of valid response sets received are provided elsewhere in this chapter.

Variables of the Study

The dependent variables of the study were custodial workers' perception of their job and work environment, receptivity to change, and ratings of TQM practice in their units. The independent variables of the study were gender, years of service in the particular unit, age,

and number of years of formal education of the campus facilities custodial workers.

Although the custodial workers selected to participate in this study were affiliated with three different universities, no attempt was made to categorize this distinction as an independent variable.

Development of the Instrument

The procedure formulated to complete this study required the development of a paper and pencil instrument used to survey the campus facilities workers and thus collect data. This section describes the development of the required instrument and includes an overview of the instrument development process and pilot testing.

Overview of the instrument development process

The development of the instrument was an iterative process. Previously established job satisfaction, innovativeness, and quality management scales described in the literature were studied in detail so that suitable models for the proposed instrument could be identified (Cook, 1981; Flynn, 1994; Price, 1972; Price & Mueller, 1986). Each successive version of the instrument was modified based on feedback received from a panel of knowledgeable experts whose members are listed in Appendix A. The iterations culminated in a 55-item instrument to measure the three major constructs of custodial worker organizational reaction, receptivity to change, and rating of their unit's quality management initiatives. Appendix B contains a copy of the version of the instrument that was ultimately used for data collection.

Organizational reactions scale

This scale purported to measure the satisfaction of custodial employees with their job and work environment drew a significant number of insights from the instrument titled: Index of Organizational Reactions (IOR) (Price, 1972; Smith 1962; Smith et al., 1976). Originally proposed to tap eight specific satisfactions listed as supervision, company identification, kind of work, amount of work, coworkers, physical work conditions, financial rewards, and career future, the IOR has been used to survey blue-collar workers in previous studies (Cook, 1981: Smith et al., 1976). It was visualized that the IOR coupled with suitable changes would aptly meet the requirements of defining a new organizational reaction scale specifically for custodial workers.

In the development of the proposed new organizational reaction scale for custodial workers, the specific dimensions of supervision and physical work conditions, as present in the original IOR, were not considered. Supervision was ignored because the typical re-engineered organization empowers its workers and supervisors typically play the role of coaches. Physical work conditions were ignored because items pertaining to this factor could be confusing to the campus facilities workers as they are the primary group of individuals responsible for maintaining a clean and safe environment on campus.

The items categorized under kind of work and amount of work were thought of as describing a single factor which could be labeled work itself. A similar reasoning was applied for items describing the dimensions of financial rewards and career future. These two dimensions were construed of jointly representing a new dimension called incentives.

These changes were necessary to keep the size of the instrument at a manageable level while providing room for items describing other new sub-scales.

The knowledgeable panel of experts recommended that two new dimensions not considered in Smith’s index of organizational reactions would be appropriate in addressing current and future informational needs of the physical plant management. Increased emphasis on meeting and exceeding customer expectations is an important desired outcome in a typical job re-design. In addition, the support systems intended to facilitate workers in executing their jobs are affected by TQM and reengineering. Hence, two new sub-scales (dimensions) substantially original to this study were considered worthy of inclusion in the envisioned custodial worker organizational reaction scale. Customer service philosophy and workplace support were the terms used to describe these sub-scales. Thus, the major construct of organizational reaction in the proposed research instrument contained six sub-scales. Table 3.1 depicts an item specification table for this portion of the instrument.

Table 3.1. Item specification table for the Custodial Worker Organizational Reaction scale

Dimension/Factor	Item Numbers
Company Affiliation	1, 2, 3, 4, 5
Work Itself	6, 7, 8, 9, 10
Co-employees	11, 12, 13, 14, 15
Customer Service Philosophy	16, 17, 18, 19
Incentives	20, 21, 22, 23, 24,
Workplace Support	35, 36, 37, 38, 39, 40

Receptivity to change scale

The items in the scale purported to measure employee willingness to accept organization changes was largely derived from a prior study that was concerned with the development of valid and reliable measures of motivation and morale (Patchen, 1965). Five aspects of motivation and morale were investigated in the original study: job motivation, interest in work innovation, willingness to express disagreement with supervisors, attitude toward changes introduced into the job situation, and identification with the work organization.

Patchen's (1965) study was evaluated very favorably in the literature related to organizational measurements in terms of both validity and reliability (Price, 1972; Price & Mueller, 1986). The items based on the factors labeled as interest in work innovation and attitude toward changes introduced into the job situation were tailored to address the current research needs. An index computed by averaging the scores on these items was considered to establish an objective measure of the construct employee receptiveness to change. Table 3.2 shows the item specifications for the receptiveness to change scale created in the instrument developed for this study.

Table 3.2. Item specification table for the Receptiveness to Change scale

Dimension/Factor	Item Numbers
Aptitude for Work Innovation	25, 26, 27, 28, 29,
Acceptance of Job Re-design	30, 31, 32, 33, 34

Measuring the practice of the principles of quality management

Pascoe's (1992) study related to the importance of key components of total quality management programs was used as a model to design specific items intended to measure the extent of adoption of the quality management philosophies. According to this model, four significant components emerge within the philosophy of the most popular of all quality management doctrines, namely total quality management (TQM). The four tenets include continuous improvement, customer orientation, management commitment, and employee involvement. Pascoe's (1992) instrument was originally comprised of 15 items, and this provided the framework to formulate items designed to quantify the custodial workers' ratings of quality management initiatives within their unit. In the final instrument, there were 15 items (item numbers 41-55) designed to capture the ratings of quality management initiatives as perceived by campus custodial workers. The item specification for the third major a priori construct—quality management initiatives, is shown in Table 3.3.

Table 3.3. Item specification table for the Extent of Adoption of the principles of quality management initiatives

Dimension/Factor	Item Numbers
Customer Orientation	41, 42, 43, 44
Management Commitment	45, 46, 47
Continuous Improvement	48, 49, 50,
Employee Involvement	51, 52, 53, 54, 55

Respondents could indicate their perceptions as related to the statement prepared for each item on an interval scale of 1-5. Items 33, 34, and 53 also contain a sixth answer as a possibility, and this was necessary due to the nature of the items themselves. Approximately 50% (27 out of 55) of the items included statements that were reverse scored. This is a recommended practice which enhances the alertness of the respondents during the written survey (Flynn, 1994).

Pilot Testing

Pilot studies are strongly recommended before employing survey instruments that address research problems (Isaac & Michael, 1990). The proposed instrument was pilot tested prior to actual use as a data collection tool. A purposive sample of eight custodial workers based at the Iowa State University facilities management division was selected for the pilot test. The number chosen was relatively small in order to minimize the loss of subjects for the actual study (subsequently, these subjects also completed the final instrument). The purpose of the pilot test was to verify the clarity and readability of the instrument. Yet another purpose was to qualitatively determine the extent of help required by people with limited reading skills in completing the instrument. Seven of the eight subjects explained that the degree of readability and clarity was adequate, and no further modifications were necessary. One subject was unable to read and the entire instrument required reading and explanation. Collecting the perceptions of this respondent proved to be challenging because of the communication barrier.

The pilot test suggested that the instrument was designed to meet the reading levels of a majority group of custodians. Others would experience difficulty due to lack of reading skills. The final solution to this problem required identifying the anticipated reading levels of respondents and classifying them into three groups; those who were adequate in reading and comprehension skills, those who were unable to read adequately well but could comprehend, and those who required help with both reading and comprehension.

One suggestion which emerged from a respondent during the pilot test was to include items related to supervisors, but due to reasons already explained, this suggestion was ignored. In general, there was consensus among the participants that the items were relevant to their job situation. As there was no negative feedback regarding the clarity of items during the pilot test, the preliminary instrument was retained as the final instrument.

Data Collection Procedure

This section describes the process involved in collecting the perceptions of the subjects based on the developed instrument. The administration of the survey instrument, the method of input solicited of the respondents, and the sample breakdown are considered.

Administration

A cover letter, as provided in Appendix C was designed to serve as a communication tool between the researcher and the respondents to the survey. The objectives of this letter included informing the respondents about the survey and to clarify any questions regarding anonymity of individual respondents and confidentiality of the individual responses provided.

Subsequently, approval was obtained from the Iowa State University Human Subjects Review Committee for administering the instrument to the custodial workers affiliated with the three major state universities of Iowa.

The surveys were conducted on site at the respective institutions. Meeting times with prospective survey respondents were scheduled through respective managerial offices. The instrument was administered to custodial workers in small groups comprising of approximately 15 individuals.

Response input

After handing out the instrument along with the cover letter, participants were provided with instructions on how to use a numerically coded (bubble) scoring sheet for recording their responses. (A copy of the NCS sheet appears in Appendix B following the Survey Instrument.) Examples backed with visual aids in the form of transparencies were used to aid the instructional process.

The subjects were given adequate time to complete their responses to the survey instrument. Although a time period not to exceed one hour was stipulated in the instrument, the respondents were allowed to proceed at their own pace. During administration of the survey to the group requiring help with reading only, transparencies of the entire instrument were used for further instruction, facilitate visualization, and clarification. The group requiring help for both reading and completing the responses were helped individually, either by this researcher or by a neutral individual. At the universities of Iowa and Northern Iowa, the subjects who were absent during the administration of the survey were provided with an

opportunity to mail their responses to the survey questionnaire. Absentee custodial workers were provided with a stamped, addressed mailing envelope to facilitate direct dispatch of their NCS sheet.

Sample breakdown

The original plan provided for all employees in each of the units surveyed to participate in the survey. However, some employees could not participate, and this resulted in an 88.3% representation of the total population of custodial workers. Table 3.4 provides a summary of the number of subjects who answered the survey at the various sites as compared to the maximum number of respondents who were expected to be present.

Table 3.4. Number of respondents from the institutions surveyed

Institution & data collection site	No. expected (population size)	Actual no.	Response rate (%)
Iowa State University (ISU) -			
Physical Plant	105	97	92.4
Residence Halls	90	65	72.2
University of Northern Iowa			
On site	59	48	81.4
Mailed	0	7	n/a
The University of Iowa			
On site	172	150	87.2
Mailed	0	9	n/a
Total	426	376	88.3

Data Analysis

The Statistical Package for the Social Sciences (SPSS Inc., 1990) software was utilized to analyze the data. Measures of central tendency and dispersion were calculated for the responses for each items. Subsequently, the mean of the item means defined the mean

values for each sub-scale (dimension). The mean of the means of the sub-scales defined the grand mean of each of the three major constructs (Cook, 1981; Pascoe, 1992; Price 1972).

Reliabilities were estimated for each sub-scale and the complete instrument. A factor analysis of the responses was also conducted. The statistical procedures used to test the hypotheses included the t-test and measures of the coefficient of correlation. Table 3.5 provides a listing of the original research hypotheses and the associated statistical procedure that was used for testing.

Table 3.5. Statistical procedures used to test the research hypotheses

Hypothesis	Statement	Statistical Proc.
H ₀ (1a)	There are no significant differences in the custodial worker organizational reaction between male and female employees.	t-test
H ₀ (1b)	There are no significant differences in the degree of receptiveness to change between male and female custodial workers.	t-test
H ₀ (1c)	There are no significant differences in the employee rating of quality management initiatives between male and female custodial workers.	t-test
H ₀ (2a)	There is no linear relationship between the custodial worker organizational reaction and the age of the employee.	correlation test
H ₀ (2b)	There is no linear relationship between the custodial worker's receptivity to change and the age of the employee.	correlation test
H ₀ (2c)	There is no linear relationship between the custodial worker's rating of quality management initiatives and the age of the employee.	correlation test
H ₀ (3a)	There is no linear relationship between the custodial worker organizational reaction and number of years of work experience at the current departmental unit.	correlation test
H ₀ (3b)	There is no linear relationship between the custodial worker's receptivity to change and the number of years of work experience at the current departmental unit	correlation test
H ₀ (3c)	There is no linear relationship between the custodial worker's rating of quality management initiatives and the number of years of work experience at the current departmental unit.	correlation test
H ₀ (4a)	There is no linear relationship between custodial worker's organizational reaction and the number of years of formal education completed by the individual.	correlation test
H ₀ (4b)	There is no linear relationship between the custodial worker's receptivity to change and the number of years of formal education completed by the individual.	correlation test
H ₀ (4c)	There is no linear relationship between a custodial worker's rating of quality management initiatives and the number of years of formal education completed by the individual.	correlation test
H ₀ (5)	There is no linear relationship between the custodial worker's organizational reaction and ratings of quality management practice in the work place.	correlation test

CHAPTER 4. RESEARCH RESULTS AND FINDINGS

The results of the data analysis and research findings are presented in this chapter. It is organized sequentially in sections as follows: (a) Descriptive Statistics; (b) Reliability Analysis of the Instrument; (c) Inferential Statistics; (d) Data Reduction; and (e) Summary of Data Analysis.

Descriptive Statistics

The independent demographic and background variables of interest in this study were previously identified as custodial worker gender, age, years of work experience with their current departmental unit, and number of years of education. The dependent variables were custodial worker's organizational reaction, receptivity to change, and ratings of quality management initiatives. This section describes the distribution of these variables based on responses gathered through the administration of the instrument.

Gender

The number of male custodial workers employed by the three state universities combined exceeded the number of female employees. The number of male workers represented totaled 208 (56.5%) whereas the number of female workers was 160 (43.5%). Two respondents did not indicate their gender.

Age

The age of the respondents varied from a low value of 21 years up to a high of 68 years old. Three individuals did not provide information related to their birth year, therefore.

their ages were undetermined. The age was determined by subtracting the birth year provided in the instrument from the number 95 because this survey was completed during the year 1995. Figure 4.1 shows a histogram (with a superimposed normal distribution curve) representing the distribution of the age of the custodial workers surveyed. The average age was estimated to be 44.7 years.

Years of service at current department

The duration of work experience of custodians with their current departmental units varied from less than a year to 35 years. Less than 20% of the workers reported having served in their current units for more than 15 years. A majority number indicated seven or fewer years of service. Five people failed to provide this information. Figure 4.2 describes the number of years of work experience of custodial workers in their present departments by means of a histogram. The average work experience was 8.7 years.G72

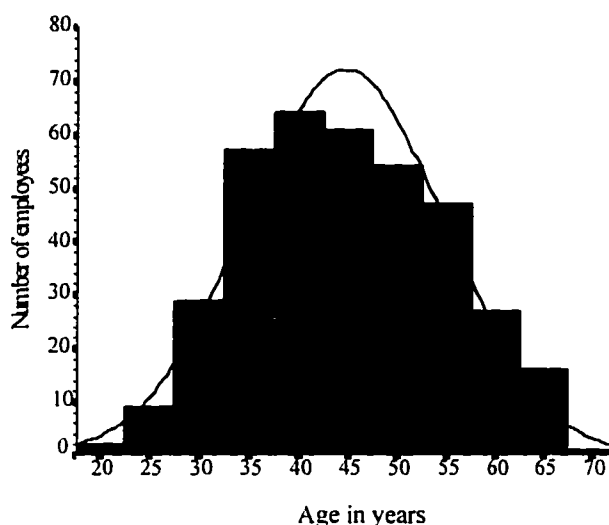


Figure 4.1. Distribution of custodial workers by age

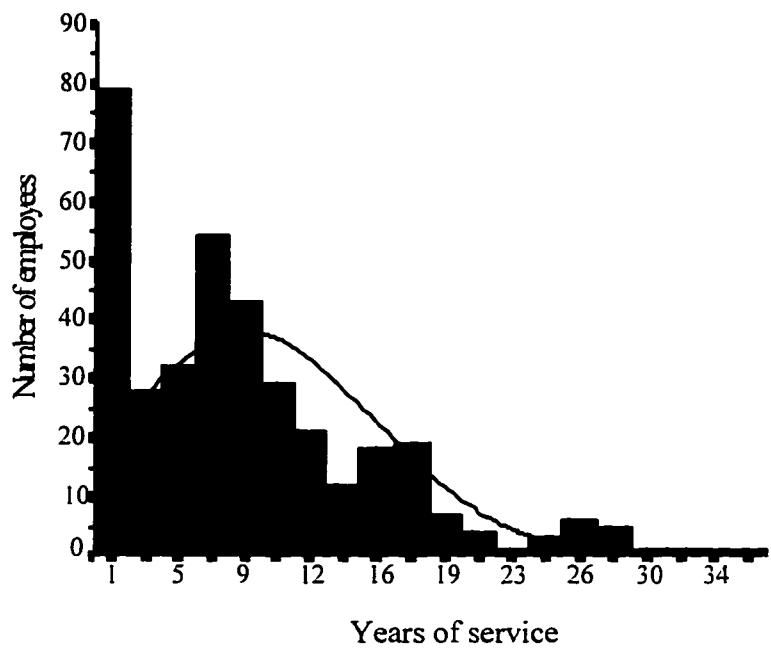


Figure 4.2. Distribution of custodial workers by years of work experience in the current department

Years of formal education completed

The average years of schooling completed was calculated to be 12.2 years for the population surveyed. A relatively low number (23) of the 362 workers who answered this question had less than ten years of formal education. Eight workers failed to indicate the number of school years completed. A majority of custodians (202 in number) had attended 12 years of school. Figure 4.3 is a bar chart reporting the distribution of years of school completed by individual custodial workers.

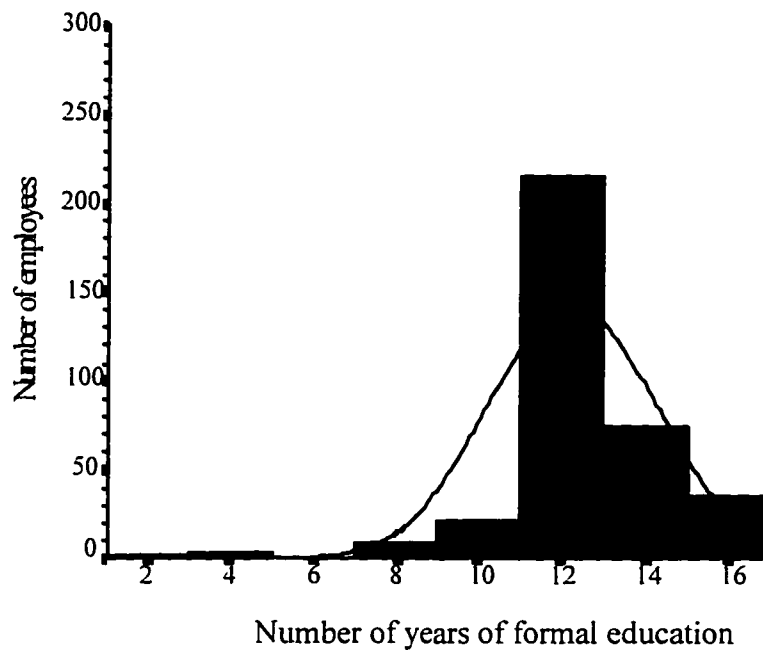


Figure 4.3. Distribution of custodial workers by years of formal education completed

Item analysis (measures of central tendency and dispersion)

Summary statistics by way of arithmetic mean and standard deviation are presented in this section. The computations were completed for each of the 55 items representing the twelve *a priori* dimensions purported to be measured, or equivalently representing the three *a priori* dependent variables of custodial worker reaction, receptiveness to change, and ratings of total quality management practices. Table 4.1 provides the itemwise measures of mean and standard deviations. The number responding to each item is also included. It should be recognized that items 33, 34, and 53 were different from rest of the items with respect to the number of anchors (choices) available as a response. The relatively low values of “N” related

Table 4.1. Means and standard deviations for the items in the survey instrument

No	Item summary	N	Mean	S. D.	Mean category
1.	Encouraged to do the best	370	4.14	1.06	+
2.	Departmental treatment of employees	370	3.10	1.01	0
3.	Excellent place to work	370	3.79	1.02	+
4.	Welfare of custodians over task	368	2.56	1.22	0
5.	Welfare of custodians over cost	367	2.44	1.21	-
6.	Everyday feeling of job accomplishment	370	4.22	0.74	+
7.	Enjoy all the work involved	369	3.15	1.28	0
8.	Like the kind of work	370	3.18	1.33	0
9.	Workload	369	2.51	1.11	0
10.	Quality of work due to workload	369	3.12	1.27	0
11.	Fellow workers as a group	370	3.24	1.06	0
12.	Influence of fellow custodians	370	3.54	1.23	+
13.	Example set by fellow custodians	369	3.05	1.00	0
14.	Success due to custodians	369	4.05	1.08	+
15.	Relationship between custodians	369	2.39	1.31	-
16.	Top management commitment	370	3.22	1.39	0
17.	Asking feedback from customers	370	3.81	1.16	+
18.	Fellow workers' knowledge of their job	370	4.14	1.01	+
19.	Fellow workers' commitment to customers	368	3.38	1.02	0
20.	Pay received	370	3.15	1.06	0
21.	Motivation due to salary	369	2.53	1.16	0
22.	Job security	370	3.35	1.31	0
23.	Learn new things on the job	369	3.39	1.26	0
24.	Opportunity to grow	370	2.15	1.28	-
25.	Encouraged to try new things on the job	369	3.64	1.10	+
26.	Prefer doing things in new ways	369	3.69	0.98	+
27.	Frequency of trying out new ideas	369	3.50	1.37	0
28.	Self-initiative to try new ideas	369	3.54	1.30	+
29.	Sharing new ideas	367	2.56	1.33	0
30.	Worth of changes introduced	369	2.57	1.11	0
31.	Quality of changes introduced	368	2.98	0.96	0
32.	Acceptance of change by workers	367	2.96	1.22	0
33.	Personal opinion about changes	285	3.14	1.21	0
34.	First impression of changes	292	3.06	1.21	0
35.	Job allows decision making	368	3.84	1.15	+
36.	Know job responsibilities	368	4.51	0.87	++
37.	Receive equipment and supplies on time	369	3.76	0.93	+

Table 4.1. (Continued)

No	Item summary	N	Mean	S. D.	Mean category
38.	Competency of supporting departments	367	3.18	1.13	0
39	Approachability of colleagues	365	3.83	1.17	+
40.	Customer empathy	366	3.47	1.33	0
41.	Effort to identify customer's needs	369	3.90	1.11	+
42.	Seeking customer input	366	3.25	1.39	0
43.	Measure customer satisfaction	367	3.33	1.33	0
44.	Inclination to meet customer's needs	369	4.32	0.97	+
45.	Top management's commitment to quality	369	3.07	1.34	0
46.	Opportunity to suggest ideas	369	3.21	1.34	0
47.	Enthusiasm of top management	369	2.94	1.26	0
48.	Belief in continuous improvement	368	3.88	1.07	+
49.	Workers' knowledge about CI	369	3.16	1.16	0
50.	Workers' involvement in CI	367	3.24	1.14	0
51.	Training to work on teams	368	2.41	1.24	-
52.	Responsibility assigned to workers	368	3.60	1.12	+
53.	Amount of suggestions by employees	332	2.64	1.18	0
54.	Feel totally in charge of work	366	3.87	1.14	+
55.	Satisfied with work schedule	365	3.78	1.23	+

KEY: ++ highly positive
+ positive
0 neutral
- negative

to the responses on these items reflects the number decreased as a result of respondents choosing the sixth anchor for each of those items. Such responses were analyzed in this case as user missing values.

Measures of central tendency and dispersion for the *a priori* selected dimensions of the instrument

The item analysis provided the basis for computing the means and standard deviations for the 12 subscales (dimensions) included in the instrument. The mean of the item means was calculated to represent the central tendency of each dimension. Subsequently, the newly computed means were used as the basis to calculate standard deviations for each dimension.

Table 4.2 provides the summary statistics of mean and standard deviation for the twelve dimensions.

Measures of central tendency and dispersion for Organization Reaction, Innovativeness and Ratings of Quality Management Initiatives

Measures of organizational reaction, innovativeness, and ratings of total quality management practice were subsequently obtained by averaging the values computed for the dimensions (in Table 4.2) assumed to be present in each of the three constructs. Summary statistics of these computations are included in Table 4.3.

Reliability Analysis of the Instrument

The internal consistency approach was the logical choice to estimate reliability because of practicality. Other techniques such as the alternative form, or the retest method

Table 4.2. Means and standard deviations for the twelve dimensions (sub-scales)

No.	Dimension	Items included	Mean	Standard deviation
1	Company identification	1-5	3.21	.71
2	Work itself	6-10	3.24	.63
3	Coworkers	11-15	3.26	.71
4	Customer service philosophy	16-19	3.64	.73
5	Incentives	20-24	2.91	.75
6	Innovativeness	25-29	3.39	.71
7	Attitude towards change	30-34	2.92	.71
8	Extrinsic support	35-40	3.76	.59
9	Customer orientation	41-44	3.70	.65
10	Top management commitment	45-47	3.07	.91
11	Continuous improvement	48-50	3.43	.78
12	Empowerment	51-55	3.27	.69

Table 4.3. Means and standard deviations for the three major constructs

Major Construct	Dimensions (Sub-scales)	Mean	Standard Deviation
Organizational reaction	Company identification	3.34	.49
	Work itself		
	Co-workers		
	Customer service philosophy		
	Incentives		
	Workplace support		
Receptiveness to change	Innovativeness	3.15	.55
	Attitude towards change		
Total quality management	Customer orientation	3.37	.54
	Top management commitment		
	Continuous improvement		
	Empowerment		

methods require two independent administrations of the instrument to the same group of people or two alternative forms of the measuring instrument. The split-half approach requires adjusting factors for test length (Borg & Gall, 1982).

The reliability analysis was conducted for each of the twelve factors assumed in formulating the instrument. The Cronbach's alpha coefficient ranged from a low value of .18 to a high of .64 for the different factors. The reliability of the overall instrument was estimated equal to .88. The alpha coefficients are reported in Table 4.4

Inferential Statistics

The hypotheses formulated at the beginning of the study were tested using standard statistical procedures. The techniques used in testing hypotheses included the Student's t-test and bivariate Pearson product-moment correlations. The significance level (p value) was

Table 4.4. Reliability analysis of the instrument

Dimension (Factor)	Item numbers	α coefficient
Company affiliation	1-5	.64
Work itself	6-10	.38
Co-workers	11-15	.60
Customer service philosophy	16-19	.49
Pay and Incentives	20-24	.59
Innovativeness	25-29	.52
Attitude towards change	30-34	.54
Support functions	35-40	.51
Customer focus	41-44	.18
Top management	45-47	.47
Continuous improvement	48-50	.46
Empowerment	51-55	.52
Overall	1-55	.88

studied for individual hypothesis tests. A cut-off level of significance equal to .05 was universally used as a basis for retaining or rejection of each null hypothesis.

Tests of Hypotheses

The hypotheses related to the independent variable gender were analyzed using the t-tests. In such cases, the Levene’s test for equality of variances dictated the appropriate t-test, that is, whether equal or unequal variances would be assumed to test for equality of means related to the dependent variable. Hypotheses associated with the independent variables of age, the number of years of work experience of the custodial worker in their current units,

and levels of education were tested on the basis of bivariate Pearson product moment correlations.

Hypothesis 1a. There are no significant differences in the organizational reactions of male and female custodial workers.

The purpose of this hypothesis was to determine whether male and female workers rated their organizations in a statistically equivalent manner. A t-test analysis was conducted and significant differences were found at a level of .028. Therefore, the null hypothesis was rejected. Further examination revealed that female workers rated their organizations more positively than their male counterparts. The computed level of this difference in perception was estimated as .11. Considering that the mean value of the organizational reactions for male and female custodial workers were 3.29 and 3.40 respectively, the statistical significance of the result however does not imply that there are strong differences in the perceptions of female and male custodial workers.

Hypothesis 1b. There are no significant differences in the receptiveness to change between male and female custodial workers.

The purpose of this hypothesis was to verify whether male and female workers were equally inclined to accept induced organizational changes. A t-test analysis was conducted and the resulting significance level of .66 directed that the null hypothesis be retained. Therefore, there are no differences of perception between male and female workers in their willingness to embrace organizational changes that may be introduced from time to time.

Hypothesis 1c. There are no significant differences in the employee rating of total quality management initiatives between male and female custodial workers.

The purpose of this hypothesis was to verify whether male and female workers held statistically identical perceptions of total quality management practices adopted in their respective units. The t-test revealed a two-tail significance level of .08, implying that the null hypothesis should not be rejected. Therefore, male and female workers' perceptions of quality management initiatives in their departments were not different.

Hypotheses 2a through 5 were each analyzed by testing for a significant presence or absence of a linear correlation between the variables of interest. All of the scatter plots for the variables were pre-examined to verify the complete absence of any non-linear patterns. Therefore, it was statistically sound to use linear correlation as a measure of associative relationship.

Hypothesis 2a. There is no linear relationship between the custodial worker's organizational reaction and age of the employee.

The purpose of this hypothesis was to determine whether there were any significant linear relationships between the age of individual custodial worker and perceptions of their organizational units. A bivariate correlation test revealed that the null hypothesis be rejected at a significance level of .008. The coefficient of correlation between the variables age and organizational reaction was estimated equal to .14. It can be concluded that older custodial workers held more positive perceptions related to their job and work environment. However, this association between age and organizational reaction is a weak relationship.

Hypothesis 2b. There is no linear relationship between the custodial worker's receptivity to change and age of the employee.

The purpose of this hypothesis was to determine whether there were any significant linear relationships between the age of individual custodial worker and their inclination to

accept organizational changes that may be introduced. A bivariate correlation test revealed relatively strongly that the null hypothesis be retained at a significance level of .73. The existence of a linear relationship between custodial workers' age and their willingness to deal with organizational change was thus not supported. This means that age was not a determining factor in custodial workers' receptivity to changes in the workplace as dictated by an examination of linear correlation.

Hypothesis 2c. There is no linear relationship between the custodial worker's ratings of quality management initiatives and age of the employee.

The purpose of this hypothesis was to determine whether there were any significant linear relationships between the age of individual custodial worker and their perceptions of quality management practices in their departmental units. A bivariate correlation test revealed that the null hypothesis be rejected at a significance level of at least .001. The coefficient of correlation between the variables age and ratings of quality management practice was estimated equal to .21. It can be concluded that older custodial workers perceived a larger presence of quality management initiatives in their work units as opposed to younger custodial workers. However, the low value of .21 as a correlation coefficient provides evidence of only a weak positive relationship between age and quality management perceptions.

Hypothesis 3a. There is no linear relationship between the custodial worker's organizational reaction and the number of years of work experience at the current departmental unit.

The purpose of this hypothesis was to determine whether the number of years of work experience of individual custodial workers in their current units was linearly related to their perceptions of the organization. A bivariate correlation test revealed that the null hypothesis

be retained at a significance level of .33. Therefore, the existence of any linear relationship between the years of work experience and organizational reaction was not supported by this test. It can be concluded that the duration of employment at a particular custodial unit was not a significant determinant of the organizational reaction.

Hypothesis 3b. There is no linear relationship between the custodial worker's receptivity to change and the number of years of work experience at the current departmental unit.

The purpose of this hypothesis was to determine whether the number of years of work experience of individual custodial workers in their current units was linearly related to their willingness to accept organizational change. A bivariate correlation test revealed that the null hypothesis be rejected at a significance level of .005. The coefficient of correlation was estimated equal to $-.14$. This implies that custodial workers with a shorter duration of work experience at their current departmental unit would respond more positively to changes in the work place. However, this inverse relationship is best described as weak.

Hypothesis 3c. There is no linear relationship between the custodial worker's ratings of quality management initiatives and the number of years of work experience at the current departmental unit.

The purpose of this hypothesis was to determine whether the number of years of work experience of individual custodial workers in their current units was linearly related to their perceptions of the prevalence of TQM in their organizations. A bivariate correlation test revealed that the null hypothesis be retained at a significance level of .43. Therefore, the existence of any linear relationship between the years of work experience and perceptions of TQM practice in their units was not supported by this test. It can be concluded that years of

work experience was not linearly related to custodial workers' ratings of quality management initiatives at their place of work.

Hypothesis 4a. There is no linear relationship between the custodial worker's organizational reaction and the number of years of formal education completed by the individual.

The purpose of this hypothesis was to determine whether the level of education of individual custodial workers in their current units was linearly related to their perceptions of the work unit. A bivariate correlation test revealed that the null hypothesis be rejected at a significance level of at least .001. The correlation coefficient between the two variables of interest was estimated as -.25. It can be concluded that more educated custodial workers held less positive perceptions about their job and work environment. However, this inverse relationship is best described as weak.

Hypothesis 4b. There is no linear relationship between the custodial worker's receptivity to change and the number of years of formal education completed by the individual.

The purpose of this hypothesis was to determine whether the level of education of individual custodial workers was linearly related to their willingness to be receptive to induced organizational change. A bivariate correlation test revealed that the null hypothesis be rejected at a significance level of .006. The correlation coefficient between the two variables of interest was estimated to be .15. It can be concluded that more educated custodial workers perceived themselves to be more receptive to changes in their work place. However, this positive relationship is weak (Hinkle et al., 1994).

Hypothesis 4c. There is no linear relationship between the custodial worker's rating of quality management initiatives and the number of years of formal education completed by the individual.

The purpose of this hypothesis was to determine whether the level of education of individual custodial workers in their current units was linearly related to their perceptions of quality management initiatives in their organizations. A bivariate correlation test revealed that the null hypothesis be rejected at a significance level of at least .001. The correlation coefficient between the two variables of interest was estimated as -.21. It can be concluded that more educated custodial workers thought there was less quality management initiatives established in their place of work.

Hypothesis 5. There is no linear relationship between the custodial worker's organizational reaction and ratings of quality management practice in the work place.

The purpose of this hypothesis was to determine whether the organizational reaction of custodial workers was linearly related to their ratings of quality management initiatives. A bivariate correlation test revealed that the null hypothesis be rejected at the significance level of .001. The correlation coefficient was estimated as .72. This implies there is a high positive correlation between organizational reaction and ratings of quality management initiatives.

Data Reduction

This section describes the procedure and techniques employed in verifying whether the 55-item instrument could appropriately be classified as an instrument comprising the twelve *a priori* dimensions of the three major constructs originally assumed. An exploratory factor analysis utilizing the methods of principal components with mean substitutions for missing values was conducted (Kim & Mueller, 1978). The varimax type of rotation was employed and the rotated matrix structure was obtained.

The preliminary analysis suggested 17 possible factors based on eigenvalues greater than unity. These 17 factors combined accounted for 59.9% of the total variance. The factor pattern matrix also revealed several cases where items originally construed to describe a dimension behaved otherwise. Items designed to measure the dimension of innovativeness demonstrated greatest degree of conformance with expected results. A substantial number of items from the organizational reaction and TQM rating scales were declared related in the seventeen factor solution, thus suggesting that these two major constructs may not be mutually exclusive. A scree plot of this data reduction analysis revealed that the difficult-to-interpret seventeen-factor matrix could potentially collapse into a more easily understandable five-factor solution (see Figure 4.4).

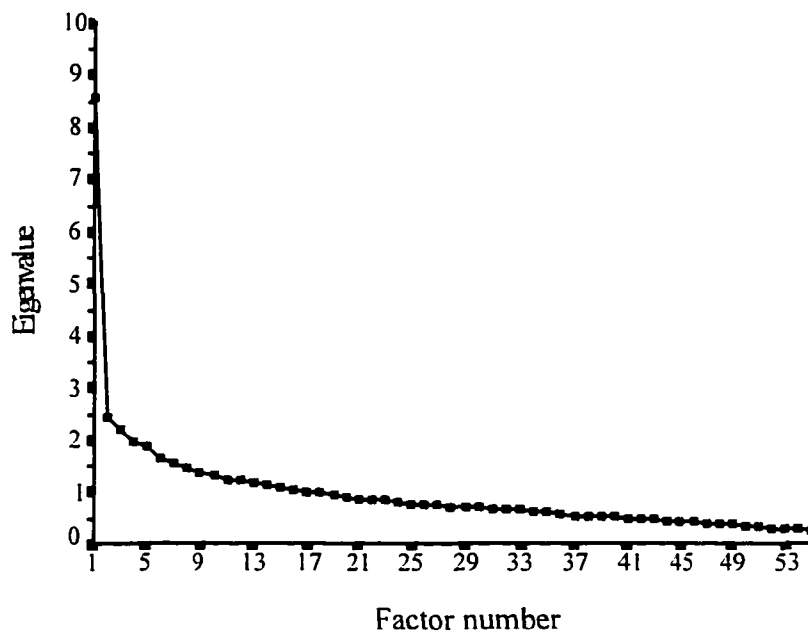


Figure 4.4. Scree plot of the data reduction analysis

A second factorial analysis seeking a five-factor solution and retaining other relevant characteristics previously described was conducted. The corresponding rotated factor matrix proved relatively easier to interpret. A study of the items within the individual clusters suggested that the five factors could be labeled as:

Factor 1: Work and its associated reward

Factor 2: Perception of respondent status within the organizational unit and coworkers

Factor 3: Attitude towards management

Factor 4: Degree of job structure and clarity of expectations of the custodial worker

Factor 5: Innovativeness

Appendix D contains a table of factor loadings for the 5-factor solution. For completeness, two other variations in data reduction were considered. Factor analyses as described above, but seeking twelve (based on the assumption of twelve a priori dimensions) and three (based on the number of major constructs purported to be studied) factor solutions was executed separately. The item affiliations in both the 12 and 3 factors' solutions reaffirmed that there was a considerable intermixing between the items construing organizational reaction and TQM. Significant re-orientation of items within each of these major constructs was also evident in eleven out of the twelve factors. As an exception, four of the five items supporting the dimension of individual degree of innovativeness grouped into one cluster, and thus, once again displayed a high degree of conformance to anticipated results.

Summary of Data Analysis

This chapter presented the findings of the study based on a statistical analysis of the data collected through the written survey instrument. The demographic characteristics of the 370 custodial workers who participated in this study were described in terms of gender, age, years of service to their current department, and years of school attendance. The computed means and standard deviations for each survey item, the 12 *a priori* defined subscales, and the three major constructs of organizational reaction, receptivity to change, and ratings of quality management initiatives were tabulated.

The research hypotheses were tested using either the t-test or the Pearson product moment correlation test. The tests revealed that each of the independent variables selected for the study, that is, gender, age, years of service, and level of education affected at least one of the three dependent variables of organizational reaction, receptivity to change, and ratings of quality management initiatives.

The internal consistency estimates of reliability were estimated for the subscales and the instrument as a whole. The overall instrument had a satisfactory reliability equal to 0.88. However, the reliabilites for individual sub-scales were somewhat lower. The data reduction technique was executed in the form of a factor analysis using the method of principal components; the resulting scree plot was used as a basis to analyze the construct validity of the instrument.

CHAPTER 5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The results reported in the previous chapter provided a basis to draw specific conclusions and state recommendations for implementation in the physical plant operations at the state universities of Iowa and for similar studies that may be undertaken in future. This chapter presents a brief summary of the study, research findings, conclusions, and recommendations.

Summary of the Study

This descriptive study employed a paper and pencil instrument to survey custodial workers employed at three major universities in the state of Iowa. The custodial workers who volunteered to complete the survey instrument came from four different departments: one each from the physical plant divisions of the University of Iowa, Iowa State University, and the University of Northern Iowa; and one from the residence halls department at Iowa State University. The primary objective of this study was to develop and validate an instrument which could be used to gather custodial workers' perceptions of their organizational unit, their receptiveness toward organizational change, and their ratings of total quality management initiatives within the organization. There is a genuine need for a paper and pencil instrument specifically intended to measure perceptions of custodial workers as they are an integral part of the campus environment (Reynolds, 1994c).

One major task that was addressed during the instrument development stage of the research was to identify the major constructs to be represented in the affective domain part of the instrument. After a decision was made to focus on three major constructs inclusive of

custodial worker organizational reaction, receptiveness to organizational change, and ratings of quality management initiatives within their organizations, the challenge was to formulate sub-scales within each major construct, and subsequently, items describing each of those selected sub-scales. The iterative process employed in designing the attitudinal measures of the instrument culminated in 55 items of which 30, 10, and 15 items represented the constructs of organizational reaction, innovativeness and quality management ratings, respectively. Besides these 55 items, a short section on demographic data was included as part of the instrument. This section provided data related to the independent variables of gender, age, years of service and education level of custodial workers who voluntarily participated in the study. A knowledgeable panel of experts assisted in establishing the content validity of the instrument.

Following a pilot test which verified the clarity and readability of the instrument, actual field testing yielded data from 370 custodial workers representing four different custodial services departments based at the University of Iowa, Iowa State University, and the University of Northern Iowa. The collection of data was accomplished by administering the instrument at each of the four sites selected as part of the study.

Data collected through the surveys were subjected to a comprehensive statistical analysis using the Statistical Package for the Social Sciences (SPSS) applications software. Both descriptive and inferential analyses were conducted. Reliabilities of individual sections and the entire paper and pencil instrument were estimated. Construct validity was established using factor analytic studies, and each of the thirteen original research hypotheses enlisted at the beginning of the study was tested at the 95% level of statistical confidence. The

systematic procedure adopted throughout the study starting from the definition of the problem to the inferential statistics enabled the researcher to state specific findings and conclusions.

Research Findings

Statistical analyses of the survey data provided useful insight related to the demographics of the custodial workers and their attitudinal perceptions in regard to custodial worker organizational reaction, receptivity to change, and ratings of quality management initiatives. This section is elaborated under the following headings (a) demographic characteristics of survey respondents; (b) reliability and validity of the instrument; and (c) attitudinal perceptions of custodial workers

Demographic characteristics of survey respondents

Responses to the designed instrument were gathered from 370 custodial workers representing four different units in the three major state universities of Iowa. Nearly 57% of these workers identified themselves as male and the rest female. The age of the respondents varied from 21 years to 68 years. Over 65% of the workers were between 30 and 55 years of age. The average number of years of service at their current unit for all custodial workers was estimated as 8.7 years. The reported range for the number of years served varied from 1 to 35 years. All but 8 of the 370 custodial workers provided a response as to their level of formal schooling; reported data indicated that 202 of the 362 custodial workers had completed at least twelve formal years of schooling beyond kindergarten. Only 23 custodians reported having attended school for less than ten years.

Due to lack of comparative data on custodial workers working in other college campuses, it is not possible to objectively elaborate further on the demographics of the custodial workers. However, it is clear that there is a fairly good balance in the female/male worker ratio, and in the proportional representation of young, middle aged and older aged custodial workers. Nearly two-thirds of those surveyed reported having served their current departments for ten years or less. The finding that a majority of custodial workers possess at least twelve years of formal education suggests that most respondents understood the directions and content of the survey instrument.

Reliability and validity of the instrument

The reliability of the overall instrument and those of the individual sub-scales were estimated. The Cronbach alpha reliability for the complete 55-item paper and pencil instrument was estimated to be 0.88. This value for the alpha coefficient clearly meets the general requirements of an attitudinal measure in terms of reliability (Nunnally, 1978). The alpha coefficients for ten of the twelve a priori defined sub-scales of the instrument were not sufficiently high because a minimum value of 0.60 is recommended by psychometric experts (Nunnally, 1978). However, with the exception of the customer orientation and work itself subscales, all other reliabilities exceeded or approached a value equal to 0.50.

The content validity of the instrument was established due to the rational approach used in identifying the subscales and formulating the items comprising the instrument. Factor analysis verified the construct validity and provided the underlying structure of the whole instrument. The 55-item instrument collapsed into five factors which were identified as work

and its associated rewards, perception of respondent status within the organizational unit, attitude towards management, degree of job structure and clarity of expectations of the custodial worker, and innovativeness.

Attitudinal perceptions of custodial workers

Statistical analyses of the responses revealed numerous findings related to the perceptions of the custodial workers. Furthermore, the hypotheses formulated at the beginning of the study revealed specific findings related to the independent variables of custodial workers' gender, age, years of work experience and level of education.

1. *H₀(1a): There are no significant differences in the employee rating of total quality management initiatives between male and female custodial workers. (Rejected)*

Female custodial workers perceived their organizational unit in a much more positive light than their male counterparts. However, this finding is strictly based on statistical evidence. The absolute value of the computed difference in the central tendencies of custodial worker organizational reaction did not reveal any serious departures in relation to the gender variable. The mean value as a measure of the central tendency (3.40 for females and 3.29 for males) of custodial worker organizational reaction suggested that both categories were "neutral" in their perceptions regarding this measure.

2. *H₀(1b): There are no significant differences in the receptiveness to change between male and female custodial workers. (Retained)*

Both male and female workers indicated almost identical preferences to be receptive to organizational change. The mean values for the dependent variable, receptiveness to change (3.16 for male and 3.13 for female) and the corresponding standard deviations (.533 and

.570) revealed that there were no differences in perception, statistically or otherwise. These numbers also suggest that both males and females exhibited neither positive nor negative affections toward organizational change.

3. *H₀(1c): There are no significant differences in the employee rating of total quality management initiatives between male and female custodial workers. (Retained)*

Both male and female workers rated the quality management initiatives within their organizations in similar terms. The ratings of male and female custodians (mean values of 3.32 and 3.42) suggest that both genders remained neutral in their perceptions of quality management initiatives that are present in their places of work.

4. *H₀(2a): There is no linear relationship between the custodial worker's organizational reaction and the age of the employee. (Rejected)*

Custodial workers who are older in terms of age generally perceived their organizational unit in a much more positive light when compared to relatively younger fellow workers. Statistically, there is a positive correlation between age and custodial worker organizational reaction. However, the value of the correlation coefficient was estimated to be very small (0.14), implying that the relationship between these two variables is weak.

5. *H₀(2b): There is no linear relationship between the custodial worker's receptivity to change and age of the employee. (Retained)*

The age of the individual worker was not a significant factor in describing the custodial worker's willingness to embrace organizational change. Statistical tests showed no significant levels of correlation between the variables age and receptiveness to change.

6. *H₀(2c): There is no linear relationship between the ratings of quality management initiatives and the age of the custodial worker. (Rejected)*

Custodial workers “older in terms of age” rated the TQM initiatives within their organizational unit more positively as compared to their relatively younger colleagues. A positive Pearson correlation coefficient of 0.21 was calculated. This however, implies very little positive correlation and does not convey any practically significant message.

7. *H₀(3a): There is no linear relationship between the custodial worker's organizational reaction and the number of years of work experience at the current departmental unit. (Retained)*

The number of years of work experience of the custodial worker at their current place of employment was not a significant factor in influencing the organizational reaction of the custodial workers. The correlation coefficient between the two variables number of years of work experience at the current “departmental unit” and “custodial worker organizational reaction” was not significantly other than zero.

8. *H₀(3b): There is no linear relationship between the custodial worker's receptivity to change and the number of years of work experience at the current departmental unit. (Rejected)*

Custodial workers who have been serving in their current organizational unit for a relatively longer duration demonstrated a less favorable inclination to accept and embrace organizational change. The correlation coefficient between the variables, years of work experience and receptiveness to change was estimated to be equal to -.14, the minus (-) sign implying negative correlation. However, this small numerical value for the correlation coefficient suggested only a very weak inverse relationship between work experience and receptivity to change.

9. *H₀(3c): There is no linear relationship between the rating of quality management initiatives and the number of years of work experience of the custodial worker at the current unit. (Retained)*

The number of years of service rendered by individual custodial workers at their current place of employment did not linearly affect their ratings of the quality management initiatives that are in place within their work units. The correlation coefficient between the two variables was not proved to be different than zero.

10. *H₀(4a): There is no linear relationship between the custodial worker's organizational reaction and the number of years of formal education completed by the individual. (Rejected)*

Custodial workers who possessed a higher level of formal education entertained less overall positive feelings toward their organization when compared to their colleagues with relatively fewer years of formal education. The correlation coefficient of -0.25 describes the extent of inverse relationship between levels of education and custodial worker organizational reaction. However, this significantly low value for the correlation coefficient can only suggest a weak inverse relationship between level of education and organizational reaction.

11. *H₀(4b): There is no linear relationship between the custodial worker's receptivity to change and the number of years of formal education completed by the individual. (Rejected)*

Custodial workers with higher levels of education displayed a more positive attitude towards accepting and being responsive to any new organizational changes that may be introduced into the workplace. The low value for the correlation coefficient (.15) between levels of education and receptiveness to change suggests a weak positive relationship between the two variables.

12. *H₀(4c): There is no linear relationship between the custodial worker's rating of quality management initiatives and the number of years of formal education completed by the individual. (Rejected)*

The ratings of quality management initiatives were inversely proportional to the level of formal education attained by the individual custodial employee. The correlation coefficient between these two variables was estimated as -0.21, which only supports the existence of a weak inverse relationship.

13. *H₀₍₅₎: There is no linear relationship between the custodial worker's organizational reaction and ratings of quality management practice in the work place. (Rejected)*

There was a strong positive correlation between the custodial worker organizational reaction and ratings of quality management initiatives proposed and implemented by management. The correlation coefficient between these two variables was estimated to be 0.72. This value suggests that there is a high positive correlation between the organizational reaction of custodial workers and perceptions of quality management initiatives that prevail in their places of work.

14. The central tendency for the measure custodial worker organizational reaction was estimated to be 3.34, implying that in general, workers held neither positive nor negative feelings toward their work units. However, the custodians perceptions related to the subscales of customer service philosophy and workplace support were positive.

15. The receptiveness to organizational change of the custodial workers in the four units considered in this study was moderate. The mean value for this measure was equal to 3.15. Although the central tendency on the subscale of innovativeness was as high as 3.39, the attitude towards change score was much lower with a mean value equal to 2.92.

16. The custodial workers' ratings of quality management practices prevalent at their work places was moderate. The mean value for this measure was equal to 3.37. Ratings were

somewhat higher on the dimensions of customer orientation and continuous improvement when compared to the subscales of top management commitment and empowerment.

17. Custodial workers expressed most positive feelings about their knowledge of job responsibilities, the commitment of top management to meet all of the needs of the customers, every-day feeling of job accomplishment, being encouraged to do their best, and be able to directly interact with their customers.

18. Custodial workers were most negative about their feelings regarding the opportunities for upward mobility in their organization. Other immediate concerns expressed were the quarreling among fellow custodial workers, lack of training to work together as a team, and that management placed more priority on cutting down costs rather than address the needs of the custodial workers.

Briefly, eight out of the thirteen research hypotheses formulated at the beginning of the study were rejected. The independent variables gender, age, years of work experience, and level of education were all found to influence at least one of the three dependent variables that is, custodial worker organizational reaction, receptiveness to change and ratings of quality management initiatives. All findings that are statistically significant do not however translate into meaningful research discoveries. One important finding was the existence of a strong positive relationship between the organizational reactions of custodial workers and perceptions of quality management initiatives that have been established within the place of work.

Conclusions

Based on the observations and findings from the data analysis it is possible to draw specific conclusions. This section is presented under the following sub-headings: (a) Fitness of the proposed instrument; (b) Attitudinal perceptions of custodial workers; and (c) Other significant comments.

Fitness of the proposed instrument

The overall instrument inclusive of all the 55 attitudinal items had a reliability of 0.88 as determined by Cronbach's alpha coefficient. This exceeds the general minimum requirements related to the reliability of attitudinal instruments (Nunnally, 1978). The sub-scales of company affiliation and coworkers possess sufficient reliabilities when considered in isolation. Other sub-scales of the instrument do not fulfill the general minimum requirements in terms of reliability (Nunnally, 1978). In order to ensure sufficient reliability, it would be appropriate to use the instrument in its entirety and not just parts of the instrument. The proposed instrument also has an established content and construct validity. A factor analysis provided the underlying structure of the overall instrument and included the dimensions: (a) work and its associated rewards; (b) perception of respondent status within the organizational unit; (c) attitude towards management; (d) degree of job structure and clarity of expectations of the custodial worker; and (e) innovativeness.

Attitudinal perceptions of custodial workers

The scores on the three major dependent variables of the study, namely organizational reaction, receptivity towards change, and ratings of quality management initiatives

established the attitudinal perceptions of the custodial workers. Specific conclusions on each of the dependent variables in terms of custodial workers' gender, age, years of work experience, and level of education are reported in this sub-section. Although the mean as a measure of the central tendency was used to qualitatively describe the findings, it should be recognized that the standard deviations associated with the mean values indicate the presence of some variability in the perceptions of custodial workers.

Organizational reaction

The overall index for the organizational reaction of custodial workers indicated that the employees at the four units in the state universities of Iowa perceived their work units in a neutral sense, that is, they held neither positive nor negative feelings about their job and work environment. The custodial workers' level of education, age, and gender influenced the employees' overall perception of their organizations. The number of years of work experience in the specific work unit did not influence organizational reaction. Workers with higher levels of education perceived their organizations more harshly than their colleagues who had received comparatively less education. In general, female workers held more positive perceptions of their organization when compared to male custodians. Also, older custodial workers rated their organizations much more favorably than their relatively younger colleagues.

As exceptions to the overall feeling of neutrality about their organizations, custodians entertained slightly positive perceptions related to the dimensions of customer service philosophy and workplace support. It may be concluded that there is sufficient realization

both on the part of the workers and management that customers are important. Positive attitudes related to workplace support suggested that there was general acceptance in the institution that the tasks performed by custodians are significant and a reasonable amount of cooperation prevailed between the custodians and the rest of the university.

Although direct comparisons of the reported scores of the custodial workers in this study with those of other studies may have serious limitations (for examples, differences in the wording of items, scaling procedures, and nature of the sample), one comparison was considered noteworthy. Studies conducted by Smith et al. (1976) using the original version of the "Index of Organizational Reactions" instrument yielded mean scores of 3.19, 3.21, 3.41, and 2.93 on the sub-scales of company identification, work itself, co-workers, and incentives (some additional assumptions were necessary to arrive at the reported values so that reasonable comparisons could be made). Corresponding values for custodial workers in the present study was 3.21, 3.24, 3.26, and 2.91. Comparative data related to customer service philosophy and workplace support were not available in the parent literature.

Receptivity to change

The custodial workers included in this study possessed a moderate amount of openness and willingness to accept and perceive organizational changes in the workplace as evidenced by the mean score on the variable receptivity to change. The independent variables, level of education and years of work experience, affected the custodial workers' receptivity to change whereas gender and age were declared irrelevant. Custodians with higher educational backgrounds demonstrated more openness to changes that may be

introduced in the workplace. If changes are planned to take place in a phased manner, it may be wiser to initiate the new programs where employees are more educated. Employees with more work experience were less receptive to organizational changes. Although not tested rigorously using statistical procedures, it was noted that perceptions of attitude towards change were somewhat smaller in comparison to the innovativeness scores. This could imply that the custodial workers were skeptical of management-induced changes.

Ratings of quality management initiatives

Custodial workers participating in this study declared that modest amounts of quality management initiatives are prevalent and practiced by management in their places of work. Three out of the four independent variables investigated affected the ratings on quality management initiatives that are in effect in the workplace. Gender was not an influencing factor whereas the role played by level of education, years of experience and age of the custodial worker were declared significant. More educated custodians rated the quality initiatives harsher than those who had attended fewer years of school/college. Younger custodial workers perceived that there was less of quality management initiatives as did workers with fewer years of experience in their present custodial departments. These findings suggest that younger custodial workers and those with higher levels of education may be more demanding in terms of total quality management. Based on the findings related to the years of experience, it may be argued that it takes more time for custodial workers to realize the practical difficulties faced by management in implementing total quality initiatives in the workplace.

As the items describing the construct of quality management initiatives were patterned after a scale originally devised by Pascoe (1992), it was considered reasonable to compare the mean scores reported in that study with those obtained from the custodial workers ratings in the present study. Mean scores of 3.63, 3.58, 3.78, and 3.18 were obtained for the subscales of customer orientation, top management commitment, continuous improvement, and empowerment in Pascoe's (1992) study; corresponding scores from the custodial workers in this study were 3.70, 3.07, 3.43, and 3.27 respectively. It must be noted that there are significant differences at least in terms of occupation of the target population, sample, and sample size between the two studies.

A closer scrutiny of the subscale measures revealed that the custodians rated management commitment and empowerment much lower when compared to customer orientation and continuous improvement. The mean score related to customer orientation reflected a positive attitude and corresponding value for continuous improvement implied a nearly positive attitude. The relatively low scores on the means for top management commitment and empowerment should be a cause for concern for managers of physical plants. This is because top management commitment has been identified and hailed as one of the most important feature of successful TQM programs (Johnson, 1993). Although the mean score for empowerment is higher than the corresponding value for top management commitment, there is also some cause for concern in this regard. Empowerment of individual employees is the hallmark of truly quality managed organizations and the physical plant management should recognize the potential for improvement in this area.

Other significant remarks

A high positive correlation existed between the scales originally assumed to define the major constructs of organizational reaction and quality management initiatives. This should be encouraging to campus facilities departments that are transforming into quality managed organizations. The high value of the Pearson product moment correlation accompanied by a logical analysis of the two constructs suggests that the key components of quality management initiatives also define some of the characteristics inherent in describing the overall organization. By focusing on improving top management commitment, increased employee empowerment, promoting continuous improvement, and encouraging customer orientation, physical plants should be able to improve custodial worker perceptions of the overall organization.

The most serious concerns of custodial workers derived from the item analysis should be perceived as important issues for top management:

- lack of opportunities for upward mobility in the organization;
- quarreling among fellow custodial workers;
- lack of training to work in teams; and
- managers' prioritizing cost cutting over understanding custodians.

More specifically related to quality transformed organizations, the issues of quarreling among employees and lack of training to work in teams are important. The specific reasons for poor relationships among custodians may actually violate one of the key tenets of Deming's (1986) fourteen-point philosophy for management:

Drive out fear from the workplace.

The perception regarding the lack of training to work in teams may be an opportunity for management because this is an expression of a desire on the part of custodians to collaborate with their colleagues. As team work and multitasking are considered vital in quality transformed organizations, the need for training deserves consideration. Management should also explore possibilities for improved advancement of custodians within the organization and train middle and lower level management to be more empathetic to the concerns of custodians in issues related to the economics of operations.

Recommendations

This section presents recommendations based on the findings of the study. Suggestions for practice at the three institutions included in the study are made as well as for future research related to organizational change in campus facilities.

Suggestions for practice

The proposed instrument has been shown to be suitable to determine the organizational reaction, receptivity to change, and ratings of quality management initiatives of custodial workers employed in the state universities of Iowa. To ensure reliability, it is recommended that the instrument be used in its entirety rather than partially. If there are constraints in the administration of the survey instrument to an entire population of custodial workers, random samples may be taken. Care should be taken to assure the instrument is administered appropriately to meet the reading levels of each participant.

In light of the strong positive correlation between the organizational reaction and ratings of quality management initiatives, the facilities planning and management

departments should continue their efforts in changing to become quality-managed organizations. Self-reported measures may also be sought from lower, middle, and upper management levels in order to gather a more comprehensive picture of the organization. Customer surveys would also be a valuable tool in this regard.

This study has benchmarked self-reported measures of organizational reaction, receptivity to change, and ratings of quality management initiatives in physical plants in the state universities of Iowa. There is room for improvement in all of the three areas. As organizational change is a dynamic process, it would be appropriate to repeat the measure to verify any changes. It may even be worthwhile to pursue a longitudinal study involving a span of ten or more years.

Management should make efforts to understand why quarreling among custodial workers takes place and take remedial action. The techniques of qualitative research might be useful in this case. Training to work in teams must be instituted to enhance cooperation in the work place. This will improve productivity and quality as well as overall worker satisfaction. As opportunities for upward mobility within the organization is of significant concern among custodial workers, management should try to come up with innovative ways to address this issue.

Suggestions for future research

The overall reliability of the complete instrument is satisfactory for repeated use. However, the reliabilities of all the subscales need to be improved. Future research should consider adding more relevant items to each of the subscales and repeating the reliability and

factor analyses. In addition, the validity of the instrument can be improved by using the item discrimination index procedures recommended by Menne and Tolsma (1971). This analysis technique would require considering individual institutions themselves as independent variables.

Custodial workers based at institutions in other states should also be studied in order to enhance the generalizability of the research findings. It would be interesting to note if there are regional differences among custodial workers regarding the attitudinal measures considered in the present study. As some custodial workers have limited reading skills, future research should attempt to improve the instrument's readability. Using the Fry's readability formula (cited in Willingham, 1990) could be one approach to improve the instrument's readability so that even custodial workers with lower levels of education do not misinterpret items. This would potentially enhance the reliability of all or parts of the instrument.

APPENDIX A. KNOWLEDGEABLE PANEL OF EXPERTS***From Iowa State University:***

John C. Dugger, Ph.D.
Associate Professor and Chair
Department of Industrial Education and Technology

W. Robert Stephenson, Ph.D.
Associate Professor
Department of Statistics

Barbara Flynn, Ph.D.
Associate Professor
Department of Management

Gary Reynolds, M.Sc., P.E.
Director
Department of Facilities Planning and Management

Dick Begg
Assistant Manager
Department of Facilities Planning and Management

John Sluis
Assistant Manager
Department of Facilities Planning and Management

John Riley, Ed.D.
Professor Emeritus
Department of Industrial Education and Technology

From another institution:

Denis E. Zeimet, Ph.D., CIH
Safety Science Program Director
Des Moines Area Community College

APPENDIX B. SURVEY INSTRUMENT AND NCS SCORE SHEET**Organizational Reaction Rating Scale**

Radha Balamuralikrishna & John Dugger
Department of Industrial Education and Technology
Iowa State University

The purpose of this survey is to understand your opinions and feelings about your job and the custodial services / building services department.

Please Note: *Responses to this survey will be treated confidentially. In addition, no individual responses will appear in any report. Therefore, please respond honestly without being fearful of any person or any consequence.*

Directions

1. **Do not write your name or sign anywhere in this booklet.**
2. **This survey consists of two parts. Your responses for both parts should be written on the “bubble sheet” which is provided. Part 1 is a short section which should be filled out per the directions of your moderator. If in doubt, raise your hand and your moderator will be there to assist you.**
3. **Part 2 of the survey contains 55 items related to your job and work environment. For each item, please select only ONE choice which corresponds most closely with your opinion. Your choice should be indicated on the bubble sheet as explained by your moderator.**
4. **There are no correct or wrong answers in this survey. Instead, we are interested in understanding your honest opinion regarding some issues related to your job.**

Part 1

Please await instructions from your moderator before you begin. Responses to this part should be provided on the left half of SIDE 1 of your bubble sheet.

IMPORTANT: Please leave the NAME and IDENTIFICATION NUMBER columns blank.

1. **My gender (sex) is:**
M. Male
F. Female

2. **EDUCATION. The number of years I have attended school is:**
Indicate the appropriate number of years ranging from 0 to 16.
3. **BIRTH DATE** (to indicate age). **My birth year is:**
Leave the month and day columns blank. Fill in the digits corresponding to your birth year only.
4. **The number of years I have worked with the present Custodial/Building Services department is:**
Indicate the number of years in the SPECIAL CODES section.

You may now proceed to Part 2 of this survey.

Part 2

1. **I feel encouraged to do my best for the Custodial/Building Services department.**
 - A. Strongly agree
 - B. Somewhat agree
 - C. Neither agree nor disagree
 - D. Somewhat disagree
 - E. Strongly disagree
2. **From my experience, I feel that the Custodial/Building Services department treats its employees ____?**
 - A. Poorly
 - B. Somewhat poorly
 - C. Fairly well
 - D. Quite well
 - E. Extremely well
3. **Custodial/Building Services is an excellent place to work.**
 - A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree

4. **Management considers the welfare of custodians more important than getting the jobs done.**
 - A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
5. **Management considers the welfare of custodians more important than cutting down costs.**
 - A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
6. **When I finish a day's work, I feel that I have done a good job:**
 - A. Always
 - B. Most of the time
 - C. About half of the time
 - D. Less than half of the time
 - E. Never
7. **I enjoy all the work that I do in my job.**
 - A. Strongly disagree
 - B. Somewhat disagree
 - C. Neither disagree nor agree
 - D. Somewhat agree
 - E. Strongly agree
8. **I feel that the work I do is the kind of work that I like the most.**
 - A. Strongly agree
 - B. Somewhat agree
 - C. Neither agree nor disagree
 - D. Somewhat disagree
 - E. Strongly disagree
9. **I feel that my workload is heavy.**
 - A. Strongly agree
 - B. Somewhat agree
 - C. Neither agree nor disagree
 - D. Somewhat disagree
 - E. Strongly disagree

- 10. The quality of my work suffers because my workload is heavy.**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
- 11. This is how I feel when I consider all other fellow custodians as a group:**
- A. They are the best group I could ask for
 - B. I like them a great deal
 - C. I like them fairly well
 - D. I have no feeling one way or the other
 - E. I don't particularly care for them
- 12. My attitude towards my job is favorably influenced by my fellow custodians.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
- 13. The example that most of my fellow custodians set:**
- A. Greatly discourages me from working hard
 - B. Somewhat discourages me from working hard
 - C. Has little effect on me
 - D. Somewhat encourages me to work hard
 - E. Greatly encourages me to work hard
- 14. How much does the way fellow custodians handle their jobs add to the success of Custodial/Building Services?**
- A. It adds almost nothing
 - B. It adds very little
 - C. It adds only a little
 - D. It adds quite a bit
 - E. It adds a very great deal
- 15. There is quarreling among custodians.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree

16. **The management of Custodial/Building Services is totally committed to meeting all of the customers' needs.**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
17. **Feedback information from customers is used to improve the quality of custodial services.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
18. **Most of my fellow workers know what to do when a customer has a request or complaint.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
19. **In your opinion, are your custodian colleagues totally committed to meeting all of the customers' needs and expectations?**
- A. Not at all
 - B. Less than 25% are totally committed
 - C. About 50%
 - D. More than 75%
 - E. All of my colleagues are totally committed
20. **For the job that I do, I feel that the amount of money I make is ? .**
- A. Extremely good
 - B. Good
 - C. Neither good nor poor
 - D. Fairly poor
 - E. Very poor

- 21. The pay system in Custodial/Building Services encourages me to work harder.**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
- 22. I feel secure about my future with Custodial/Building Services.**
- A. Strongly agree
 - B. Somewhat agree
 - C. Neither agree nor disagree
 - D. Somewhat disagree
 - E. Strongly disagree
- 23. My job is helping me learn new things.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
- 24. I have good opportunities for moving ahead in this department.**
- A. Strongly disagree
 - B. Somewhat disagree
 - C. Neither disagree nor agree
 - D. Somewhat agree
 - E. Strongly agree
- 25. In my kind of work, if I try new ways to do things, it usually turns out worse.**
- A. Strongly agree
 - B. Somewhat agree
 - C. Neither agree nor disagree
 - D. Somewhat disagree
 - E. Strongly disagree
- 26. I prefer doing things in new and different ways.**
- A. Strongly agree
 - B. Somewhat agree
 - C. Neither agree nor disagree
 - D. Somewhat disagree
 - E. Strongly disagree

27. **This is how often, on my own, I try a better or faster way of doing something on the job:**
- A. Once a week or more often
 - B. Two or three times a month
 - C. About once a month
 - D. Every few months
 - E. Rarely or never
28. **In my kind of job, it's usually better to let somebody else worry about new or better ways of doing things.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
29. **The number of times I told somebody in my department a different or better way to do a job during the past three months:**
- A. Never did so during the past three months
 - B. Once
 - C. Two or three times
 - D. Four or five times
 - E. More than five times had occasion to do this during the past three months
30. **In Custodial/Building Services, when changes are introduced in the way a job is done, the changes have been more trouble than they are worth.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
31. **From time to time changes in policies, procedures and equipment are introduced by the management. How often do these changes lead to better ways of doing things?**
- A. Changes of this kind never improve things
 - B. They seldom do
 - C. About half of the time they do
 - D. Most of the time they do
 - E. Changes of this kind are always an improvement

32. **Most of my fellow custodians have accepted all changes introduced into their job situation.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
33. **This is the way that I feel about the changes during the past three months that affected the way my job is done:**
- A. Made things somewhat worse
 - B. Not improved things at all
 - C. Not improved things very much
 - D. Improved things somewhat
 - E. Been a big improvement
 - F. There have been no changes in my job in the past three months
34. **During the past three months when changes were introduced that affected the way your job is done, how did you feel about them *at first*?**
At first I thought the changes would:
- A. Make things somewhat worse
 - B. Not improve things at all
 - C. Not improve things very much
 - D. Improve things somewhat
 - E. Be a big improvement
 - F. There have been no changes in my job in the past three months
35. **My job allows me to make a lot of decisions on my own.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
36. **I know exactly what my job responsibilities are:**
- A. Strongly agree
 - B. Somewhat agree
 - C. Neither agree nor disagree
 - D. Somewhat disagree
 - E. Strongly disagree

- 37. I receive equipment and supplies as soon as I need them:**
- A. Always
 - B. More than 75% of the time
 - C. About 50% of the time
 - D. Less than 50% of the time
 - E. Never
- 38. Other departments which assist Custodial/Building Services are competent in doing their jobs.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
- 39. If I have a question regarding some aspect of my job, this is how often I approach somebody immediately and seek help:**
- A. Always
 - B. About 75% of the time
 - C. About 50% of the time
 - D. About 25% of the time
 - E. Never
- 40. Custodial/Building Services at my institution is doing a good job.**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
- 41. My department makes a moderate effort to identify customer needs.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree

42. **Customers should participate in determining what services my department provides.**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
43. **How often do you measure your customers' level of satisfaction after completing a job?**
- A. Never
 - B. Less than 50% of the time
 - C. About 50% of the time
 - D. More than 50% of the time
 - E. Always
44. **I am expected to meet _____ ? _____ .**
- A. All of my customers' expectations
 - B. About 75% of my customers' expectations
 - C. About 50% of my customers' expectations
 - D. About 25% of my customers expectations
 - E. None of my customers' expectations
45. **Top management communicates its goals regarding the quality of services that my department should provide.**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
46. **Top management provides me with sufficient opportunities to suggest ideas to improve our service quality.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree

- 47. Workers in my department generally feel that top management is enthusiastic towards improving the quality of our services.**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
- 48. My department believes in continuing to improve upon the things we do.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
- 49. My fellow colleagues know how to continuously improve upon the work we perform.**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
- 50. My fellow colleagues are involved in the methods of continuous improvement.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
- 51. How much training have you received regarding working in teams?**
- A. None or almost no training
 - B. Just a little bit of training
 - C. Moderate amount of training
 - D. Quite a bit of training
 - E. Plenty of training

- 52. Workers who are not managers or supervisors have accepted a moderate amount of responsibility in my department.**
- A. I strongly agree
 - B. I somewhat agree
 - C. I neither agree nor disagree
 - D. I somewhat disagree
 - E. I strongly disagree
- 53. There is a reasonably high level of participation in my departments' employee suggestion program:**
- A. I strongly disagree
 - B. I somewhat disagree
 - C. I neither disagree nor agree
 - D. I somewhat agree
 - E. I strongly agree
 - F. There is no such program in my department
- 54. How often do you feel that you are totally in charge of the work you perform?**
- A. Always
 - B. About 75% of the time
 - C. About 50% of the time
 - D. About 25% of the time
 - E. Never
- 55. How satisfied are you regarding your work schedule?**
- A. I am extremely satisfied
 - B. I am somewhat satisfied
 - C. I am neither satisfied nor dissatisfied
 - D. I am somewhat dissatisfied
 - E. I am extremely dissatisfied

Sample NCS Answer Sheet (shown smaller than actual size)

[illegible]

APPENDIX C. COVER LETTER

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Education
Department of Industrial
Education and Technology
114 1 Ed II
Ames, Iowa 50011-3130
515 294-1033
FAX 515 294-1123

June 7, 1995

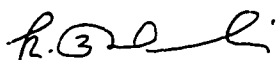
Dear Associate:

The booklet attached is a survey about your job and your Custodial/Building Services work environment. The purpose of this survey is to obtain a better understanding of your feelings about the department and how you feel about changes in general.

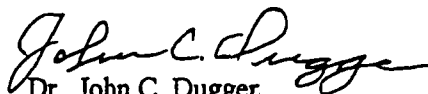
You are being asked to complete this survey in less than one hour. You are asked not to write your name or sign anywhere on the booklet. Participation in this survey is voluntary. Your decision to participate or not participate will not affect your employment in any way. Also, any information you provide will be kept strictly confidential. We appreciate your co-operation very much.

Thank you for your help.

Sincerely,



Radha Balamuralikrishna (Bala)
Doctoral Student
Industrial Education & Technology
Iowa State University
Ames, Iowa



Dr. John C. Dugger
Associate Professor & Chair
Industrial Education & Technology
Iowa State University
Ames, Iowa

APPENDIX D. FACTOR ANALYSIS LOADINGS

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
ITEM3	.61085	.18171	.13871	.08687	.17070
ITEM8	.56786	.07377	-.02609	-.06927	.03191
ITEM1	.55100	.21757	.06743	.23564	.03026
ITEM23	.52663	.05331	.07512	.18202	.15241
ITEM55	.49121	.20443	.04468	.13680	.09620
ITEM22	.47579	.15210	.11668	-.01255	.03333
ITEM17	.47332	.00846	.18174	.23023	-.11844
ITEM20	.45668	-.05009	.35327	.01983	-.07961
ITEM35	.42976	.08816	.04079	.31516	.18595
ITEM46	.42975	.07720	.21248	.13438	-.05663
ITEM54	.42412	.16988	.03207	.37756	-.02843
ITEM24	.41866	.14074	.07012	-.14450	.20103
ITEM50	.41677	.29438	-.02331	.24657	-.01817
ITEM38	.38693	.19066	.18623	-.10989	-.15566
ITEM21	.38665	.09112	.30652	.01706	-.10606
ITEM6	.36679	.26307	-.23997	.16788	.05944
ITEM37	.35685	.06618	.22615	.26956	-.19577
ITEM7	.34447	.13897	.14831	.00332	-.02169
ITEM41	.30701	-.00087	.23595	.18607	-.16405
ITEM10	.29675	-.05406	.14837	.07165	-.00083
ITEM49	-.00419	.61821	.13931	.18523	-.12015
ITEM15	.23479	.59151	.11334	-.11898	.15096
ITEM19	.07776	.58123	.02413	.20019	.11485
ITEM13	.13223	.55622	.12358	.13368	.00532
ITEM53	.16375	.44987	.23669	-.09498	-.15434
ITEM11	.35348	.42566	-.00280	.12361	.13091
ITEM51	.29658	.41778	.04414	-.14966	.26900
ITEM47	.25084	.38472	.29717	-.03430	-.17266
ITEM32	.34047	.38317	-.00830	.18493	-.10901
ITEM12	.24390	.30009	.05889	-.04153	-.04294
ITEM42	-.10623	.25527	.17933	-.03264	.01335
ITEM52	.13795	.22186	-.06002	.17686	.09465
ITEM2	.42797	.16951	.56030	.14631	.03534
ITEM5	.06890	.05004	.54199	.01118	-.10953
ITEM4	.04825	.09234	.53624	-.09026	.01524
ITEM31	.12710	.14566	.49172	.23832	.18718
ITEM45	.01673	.39051	.48287	-.01356	-.22664
ITEM30	.10904	.14649	.46399	.02388	.31364
ITEM14	.06918	.18079	.45565	.22616	.07404
ITEM33	.24273	-.01469	.41965	.14143	.28179
ITEM34	.05383	.01452	.37747	.03165	.33675
ITEM16	.24103	.22811	.35205	.00812	.06071
ITEM40	.01957	.32760	.33388	.04999	.02186
ITEM9	.08319	-.04099	.30740	.02059	-.01018
ITEM44	-.15748	.01712	.00575	.68121	-.08699
ITEM43	.11825	-.05172	.07612	.47031	.02173
ITEM36	.28872	.15612	-.08069	.44589	-.03051
ITEM25	-.19428	.04486	.15278	.43337	.36463
ITEM48	.23771	.13241	.25372	.39669	.03918
ITEM18	.23495	.36444	-.20317	.38335	.02349
ITEM39	.22206	.03861	.14548	.38199	.01568
ITEM28	-.14870	.08815	.09880	.22402	.63312
ITEM29	.03609	-.13358	.02973	-.12461	.60063
ITEM27	.05707	.07191	-.01101	-.01437	.54064
ITEM26	.30487	-.05807	-.12150	-.02753	.32358

REFERENCES

- Anderson, J. C., Rungtusanatham, M., & Schroeder, R. G. (1994, July). A theory of quality management underlying the Deming management method. *The Academy of Management Review*, 19, 472-505.
- Andros, D. P., Cherrington, J. O., & Denna, E. L. (1993). Reengineer your accounting: The IBM way. In Institute of Industrial Engineers (Comp.), *Business process reengineering: Current issues and applications*. Norcross, GA: Industrial Engineering and Management Press.
- Apel, P. J. (1994). Quality management at a small college: Maryville University. In G. L. Reynolds (Ed.), *Building quality: TQM for campus facilities managers*. Alexandria, VA: The Association of Higher Education Facilities Officers.
- Axelrod, D. (1992). Getting everyone involved: How one organization involved its employees, supervisors, and managers in redesigning the organization. *The Journal of Applied Behavioral Science*, 28(4): 499-509.
- Babich, P. (1992). Customer satisfaction: How good is good enough? *Quality Progress*, 25(12), 65-67.
- Bateson, J. E. (1989). *Managing services marketing*. London, U.K.: Dryden Press.
- Blass, A. (1995, March 16). Making the vital choice. *Far Eastern Economic Review*, pp. 42-46.
- Borg, W. R., & Gall, M. D. (1983). *Educational research: An introduction* (4th ed.). New York: Longman, Inc.
- Brown, S. W., & Swartz, T. A. (1989, April). A gap analysis of professional service quality. *Journal of Marketing*, 53, 92-98.
- Bryce, G. R. (1991, January). Quality management theories and their application. *Quality*, 20, 15-18.
- Carman, J. M. (1990). Consumer perceptions of service quality: An assessment of the SERVQUAL dimensions. *Journal of Retailing*, 66(1), 33-55.
- Cheser, R. (1994). Kaizen is more than continuous improvement. *Quality Progress*, 27(4), 23-26.

The college blue book. (1995a). *Narrative descriptions*. Vol. 1, Macmillan Reference Library (25th ed.). New York: Simon and Schuster.

The college blue book. (1995b). *Narrative descriptions*. Vol. 2. Macmillan Reference Library (25th ed.). New York: Simon and Schuster.

Cook, J. D., Hepworth, S. J., Wall, T. B., & Warr, P. B. (1981). *The Experience of work: a compendium of 249 measures and their use*. New York: Academic Press.

Cornesky, R., McCool, S., Byrnes, L., & Weber, R. (1992). *Implementing total quality management in higher education*. Madison, WI: Magna Publications Inc.

Cronin, Jr., J. J., & Taylor S.A. (1992, July). Measuring service quality: A reexamination and extension. *Journal of Marketing*, 56, 55-68.

Crosby, P. B. (1979). *Quality is free: The art of making quality certain*. New York: American Library.

Deming, W. E. (1981-82, Winter). Improvement of quality and productivity through action by management. *National Productivity Review*, 12-22.

Deming, W. E. (1986). *Out of the crisis*. Boston, MA: MIT Center for Advanced Engineering Study.

Desatnick, R. L. (1992, December). Inside the Baldrige award guidelines category 7: Customer focus and satisfaction. *Quality Progress*, 25(12), 69-74.

Deshpande, R., Farley, J. U., & Webster, F. Jr., (1993 January). Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis. *Journal of Marketing*, 57, 23-37.

Dodge, H. F., & Romig, H. G. (1944). *Sampling inspection tables*. New York: John Wiley & Sons.

Drucker, P. F. (1942). *The future of industrial man*. Westport, CT: Greenwood Publishers.

Drucker, P. F. (1991, November/December). The new productivity challenge. *Harvard Business Review*, 69-79.

Ehresman, T. (1995). Continuous improvement and process reengineering: complementary ideas or conflicting philosophies. *Proceedings of the 7th National Quality Management Conference*. San Antonio, TX: American Society for Quality Control.

- Fain, J. P. (1991). Point two: Adopt a new philosophy. In R. I. Miller (Ed.), *Applying the Deming method to higher education for more effective human resource management*. Washington, DC: The College and Personnel Association.
- Flynn, B. B., Schroeder, R., & Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management*, 11, 339-366.
- Fonseca, J. W., & Andrews, A. G. (1993). *The Atlas of American higher education*. New York, NY: New York University Press.
- Futrell, D. (1994, April). Ten reasons why surveys fail. *Quality Progress*, 65-69.
- Garvin, D. A. (1984, Fall). Japanese quality management. *Columbia Journal of World Business*, 3-12.
- Garvin, D. A. (1988). *Managing for quality: the strategic and competitive edge*. New York, NY: The Free Press.
- Ginzberg, E., & Vojta, G. (1981, March). The service sector of the U.S. economy. *Scientific American*, 244, 31-9.
- Goldsmith, R. E. (1986). Convergent validity of four innovativeness scales. *Educational and Psychological Measurement*, 46, 81-87.
- Goldsmith, R. E., & Hofacker, C. (1991, Summer). Measuring consumer innovativeness. *Journal of the Academy of Marketing Science*, 19, 209-221.
- Goodman, J. A., Boetzmman, S. M., & Ward, D. S. (1993, Autumn). Preventing TQM problems: Measured steps toward customer-driven quality improvement. *National Productivity Review*, 555-571.
- Goswamy, B. N. (1995). Quality in early India: different levels of understanding; different concerns. In J. M. Juran (Ed.), *A history of managing for quality: the evolution, trends, and future directions of managing for quality*. Milwaukee, WI: ASQC Quality Press.
- Gulledge, L. G. (1991, April). Satisfying the internal customer. *Bank Marketing*, 46-48.
- Hammer, M. J., & Champy, E. J. (1993). *Reengineering the corporation: A manifesto for business revolution*. New York, NY: Harper Business, Inc.

- Handfield, R. (1989). Quality management in Japan versus the United States: An overview. *Production and Inventory Management Journal*, 30(2), 79-84.
- Hays, D. W. (1994). Quality improvement and its origin in scientific management. *Quality Progress*, 27(5), 89-90.
- Hayslip, W. R. (1994, April). Measuring customer satisfaction in business markets. *Quality Progress*, 27(4), 83-87.
- Heath, J. A. (1994). A few good ideas for a good idea program. *Quality Progress*, 27(1), 35-38.
- Hinkle, D. E. Wiersma, W., Jurs, S. G. (1994). *Applied statistics for the behavioral sciences* (4th ed.). Boston, MA: Houghton Mifflin Company.
- Hong, J. W. (1993). *Development of an instrument to measure the levels of total quality management implementation in manufacturing organizations*. Doctoral dissertation. Iowa State University, Ames.
- Huang, C. J. (1993). *Relationships among innovativeness, attitudes, and barriers regarding the use of instructional media as perceived by teacher education in arts education programs at Taiwan teachers colleges*. Doctoral dissertation, Iowa State University, Ames.
- Hubbard, D. L. (1994). Can higher education learn from factories? *Quality Progress*, 27(5), 93-97.
- Hug, J. (1994). Gold medal service-it doesn't come easy. In G. L. Reynolds (Ed.) *Building quality: TQM for campus facilities managers*. Alexandria, VA: The Association of Higher Education Facilities Officers.
- Hurt, H. T., Joseph, K., & Cook, C. D. (1977). Scales for the measurement of innovativeness. *Human Communication Research*, 4(1), 58-65.
- Institute of Industrial Engineers. (Comp.). (1993). *Business process reengineering: Current issues and applications*. Norcross, GA: Industrial Engineering and Management Press.
- Isaac, S., & Michael, W. B. (1995). *Handbook in research and evaluation for education and the behavioral sciences* (3rd ed.). San Diego, CA: EdITS/Educational and Industrial Testing Services.

- Jackson, D. N. (1976). *Jackson personality inventory manual*. Goshen, NY: Research Psychologists Press, Inc.
- Jacob, R. (1993, October 18). TQM: More than a dying fad. *Fortune*, 66-72.
- Jacob, R. (1994, September 19). Why some customers are more equal than others. *Fortune*, 130, 215-216.
- Janson, R. (1993). How reengineering transforms organizations to satisfy customers. In Institute of Industrial Engineers (Comp.), *Business process reengineering: Current issues and applications*. Norcross, GA: Industrial Engineering and Management Press.
- Johansson, H. J., McHugh, P., Pendlebury, A. J., & Wheeler III, W. A. (1993). *Business process reengineering-breakpoint strategies for market dominance*. New York: John Wiley & Sons..
- Johnson, R. S. (1993). *TQM: leadership for the quality transformation*. Milwaukee, WI: ASQC Quality Press.
- Joiner, B. (1994) *Fourth generation management*. New York, NY: McGraw-Hill, Inc.
- Juran, J. M. (1978). Japanese and Western quality: A contrast in methods and results. *Management Review*, 67(2), 27-45.
- Juran, J. M. (1995a). A history of managing for quality in the United States of America. In Juran, J. M.(Ed.), *A history of managing for quality: The evolution, trends, and future directions of managing for quality*. Milwaukee, WI: ASQC Quality Press.
- Juran, J. M. (1995b). Summary, trends, and prognosis. In Juran, J. M.(Ed.), *A history of managing for quality: the evolution, trends, and future directions of managing for quality*. Milwaukee, WI: ASQC Quality Press.
- Kerr, R. (1982). *Psychomotor learning*. Philadelphia, PA: Saunders College Publication.
- Kim, J. O., & Mueller, C. W. (1978). *Introduction to factor analysis: What it is and how to do it*. Newbury Park, CA: Sage Publications, Inc.
- Kivenko, K. (1994, October). Improve performance by driving out fear. *Quality Progress*, 27(10), 77-79.
- Koepp, S. (1987, February 2). Pul-eeze! Will somebody help me? *Time*, pp.28-34.

- Kohnke, L. (1990, July). Designing a customer satisfaction measurement program. *Bank Marketing*, 28-30.
- Kirton, M. J. (1976). Adoptors and innovators: A description and measure. *Journal of Applied Psychology*, 61, 622-629.
- Lawler III, E. E., Mohrman, S. E., & Ledford, Jr., G. E. (1995). *Creating high performance organizations: practices and results of employee involvement and total quality management in fortune 1000 companies*. San Francisco, CA: Jossey-Bass.
- Lawton, R. L. (1993). *Creating a customer-centered culture. leadership in quality, innovation, and speed*. Milwaukee, WI: ASQC Quality Press.
- Leavitt, C., & Walton, J. R. (1975). Development of a scale for innovativeness In Schlinger M. J. (Ed.), *Advances in consumer research*, Vol. 2, Ann Arbor, MI: Association for Consumer Research.
- Leavitt, C., & Walton, J. R. (1988). *Openness of information processing as a moderator of message effects on behavior*. Faculty working paper, College of Business Administration, Columbus, OH: The Ohio State University.
- Lord, E. (1994). *Assessing quality and productivity in selected printing organizations in Iowa using the Malcolm Baldrige quality framework*. Doctoral dissertation, Iowa State University, Ames.
- Ludeman, K. (1992, December). Using employee surveys to revitalize TQM. *Training*, 51-57.
- Lytle, W. O. (1991). *Socio-technical systems analysis and design guide-for linear work*. Plainfield, NJ: Block Petrella Weisbord, Inc.
- Marchese, T. (1993, May/June). TQM: A time for ideas. *Change*, 10-13.
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50, 370-396.
- McGee, E. C., & Tolchinsky, P. D. (1993, March). The convergence of total quality and work design. *Journal of Quality and Participation*. 90-96.
- McGregor, D. M. (1957 November). The human side of enterprise. *Management Review*, 5-8.
- Menne, J. W., & Tolsma, R. J. (1971). A discriminating index for items in instruments using group responses. *Journal of Educational Measurement*, 8(1), 5-7.

- Moser, J. P. (1992). *The applicability of the Malcolm Baldrige National quality award criteria to the evaluation of quality in hospitals as perceived by the chief executive nurse*. Doctoral Dissertation, Ohio University, Athens.
- Myers, K. (1994, June). The fairness factor. *Quality Progress*, 27(6), 77-79.
- Nunnally, J. C. (1978). *Introduction to psychological measurement*. New York, NY: McGraw-Hill, Inc.
- Orpen, C. (1990). Measuring support for organizational innovation: a validity study. *Psychological Reports*, 67, 417-418.
- Parasuraman, A., Berry, L. L., & Zeithaml, V. A. (1991, Spring). Understanding customer expectations of service. *Sloan Management Review*, 13-15.
- Parasuraman, A., Zeithaml, V., & Berry, L. (1988, Spring). SERVQUAL: A multiple item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64, 12-40.
- Parker, J. (1993, May). An ABC guide to business process engineering, *Industrial Engineering*, 25(5), 52-53.
- Pascoe, L. B. (1992). *A study of the importance of key components of total quality management programs in American manufacturing firms*. Doctoral dissertation. United States International University, San Diego, CA.
- Patchen, M. (1965). Some questionnaire measures of employee motivation and morale. Ann Arbor, MI: Working Paper, pp.1-25, 40-47.
- Peterson's National College Databank (1990). *The college book of lists*. Princeton, NJ: Peterson's Guides.
- Pickett, M S. (1994). TQM at Iowa State University. In G. L. Reynolds (Ed.), *Building quality: TQM for campus facilities managers*. Alexandria, VA: The Association of Higher Education Facilities Officers.
- Prahalad C. K. (1990, April 1). *Vital speeches of the day*. Mt. Pleasant, SC: City News Publishing Co.
- Price, J. L. (1972). *Handbook of organizational measurement*. Lexington, MA: D. C. Heath and Company.

- Price, J. L., & Mueller, C. W. (1986). *Handbook of organizational measurement*. Marshfield, MA: Pitman Publishing Inc.
- Price, L. L., & Ridgeway, N. M. (1983). Development of a scale to measure use innovativeness. In Bagizzi, R. P. & Tybout (Eds.), *Advances in consumer research*, 679-684.
- Qiupeng, J., Meidong, C., & Wenzhao, L. (1995). Ancient China's history of managing for quality. In Juran, J. M. (Ed.), *A history of managing for quality: the evolution, trends, and future directions of managing for quality*. Milwaukee, WI: ASQC Quality Press.
- Quality Focus Institute Staff. (1991, April). Deciding where to start on service quality. *Bank Marketing*, 50-52.
- Reynolds, G. L. (1994a). Total quality management in facilities. In G. L. Reynolds (Ed.), *Building quality: TQM for campus facilities managers*. Alexandria, VA: The Association of Higher Education Facilities Officers.
- Reynolds, G. L. (1994b). Six action areas for total quality management. In G. L. Reynolds (Ed.), *Building quality: TQM for campus facilities managers*. Alexandria, VA: The Association of Higher Education Facilities Officers.
- Reynolds, G. L. (1994c). Personal communication on September 28th.
- Rohm, C. E. (1992/93, Winter). The Principal ensures a better future by reengineering its individual insurance department. *National Productivity Review*, 12(1), 55-64.
- Rogers, E. M. (1983). *Diffusion of innovations* (3rd ed.). New York: The Free Press.
- Rolletson, M. M. (1991, November). The total quality appraisal survey Where do you stand? *Quality Progress*, 24(11), 54-57.
- Rosenfield, M. (1994, April). Only the questions that are asked can be answered. *Quality Progress*, 25(4), 71-73.
- Saraph, J. V., Benson, P. G., & Schroeder, R. G. (1989). An instrument for measuring the critical factors of quality management. *Decision Sciences*, 20(4), 810-829.
- Schilling, R. (1984, August). The role of statistics in the management of quality. *Quality Progress*, 32-35.

- Schlesinger, L. A., & Zernitsky, J. (1991). Job satisfaction, service capability, and customer satisfaction: An examination of linkages and management implications. *Human Resource Planning, 14*(2), 141-149.
- Schmit, M. J., & Allscheid, S. P. (1995, Autumn). Employee attitudes and customer satisfaction: making theoretical and empirical connections. *Personnel Psychology, 48*, 521-536.
- Schonberger, R. (1986). *World class manufacturing: The lessons of simplicity applied*. New York: Free Press.
- Settles, S. (1993). Introduction in Institute of Industrial Engineers (1993) *Business Process Reengineering - Current issues and applications*. Norcross, GA: Industrial Engineering and Management Press.
- Seymour, D. T. (1993). *On Q: Causing quality in higher education*. Phoenix, AZ: The Oryx Press.
- Shafritz, J. M., & Ott, J. S. (1992). *Classics of organization theory* (3rd ed.). Belmont, CA: Wadsworth Publishing Co.
- Sheridan, J. H. (1990, July 2). World-class manufacturing. *Industry Week, 239*, 36-46.
- Shetty, Y. K. (1987, May-June). Product quality and competitive strategy. *Business Horizons, 46*-52.
- Shewart, W. S. (1931). *Economic control of quality for manufactured product*. New York: D. Van Nostrand Company.
- Simmerman, S. J. (1994, October). The square wheels of organizational development. *Quality Progress, 87*-89.
- Sink, S. (1995). *By what method?* Norcross, GA: Industrial Engineering and Management Press.
- Sirkin, H., & Stalk, Jr. G. (1990, July/August). Fix the process, not the problem. *Harvard Business Review, 26*-33.
- Smith, R. I., Roberts, K. H., & Hulin, C. L. (1976). Ten-year job satisfaction trends in a stable organization. *Academy of Management Journal, 19*, 462-469.

- Smith, F. J. (1962). Problems and trends in the operational use of employee attitude measurements. Paper presented to the *Annual Meeting of the American Psychological Association*.
- Spadaford, J. F. (1992/93 Winter). Reengineering commercial loan servicing at First Chicago. *National Productivity Review*, 20-23.
- Stupak, R. J. (1993, Spring). Driving forces for quality improvement in the 1990s. *Public Manager*, 22, 32.
- Taylor, F. W. (1919). *Shop Management*. New York: Harper & Brothers.
- Tompkins, N. C. (1992, November) Employee satisfaction leads to customer service. *HRMagazine*, 37, 53-55.
- Tornow, W. W., & Wiley, J. W. (1991). Service quality and management practices: a look at employee attitudes, customer satisfaction, and bottom line consequences, *Human Resource Planning*, 14(2), 105-115.
- Van-Auken, P. M. (1992, December). Control vs. development: Up-to-date or out-of-date as a supervisor? *Supervision*, 53, 17-19.
- Venkatraman, M. P. (1994, Spring). The impact of innovativeness and innovation type on adoption. *Journal of Retailing*, 87, 54-67.
- Venkatraman, M. P., & Price, L. L. (1990). Differentiating between cognitive and sensory innovativeness: concepts, measurements, and implications. *Journal of Business Research*, 20, 293-315.
- Villareal, D. (1995, February 8-10). Simulation-animation: tools to manage effectiveness in service systems. *The 7th National Quality Management Conference Proceedings*, Vol. II. San Antonio, TX: 259-266.
- Vogl, A. J. (1993, June). The age of re-engineering: An interview with M. R. Hammer and E. J. Champy. *Across the Board*, 26-33.
- Walton, M. (1986). *The Deming management method*. New York, NY: Putnam Publishing Group.
- Watkins, B.T. (1988, March 19). No more Mr. Fixit: Campus plant manager may oversee the equivalent of a small city. *Chronicle of Higher Education*, 32(3), pp. 23, 26-27.

- Weaver, J. J. (1994). Want customer satisfaction? Satisfy your employees first. *HRMagazine*, 35, 112.
- Webster, C. (1990 December). Toward the measurement of the marketing culture of a service firm. *Journal of Business Research*, 21, 345-362.
- Whiting, R. (1992, October). Do you really know what your customer wants? *Electronic Business*, 73-78.
- Wiley, J. W. (1991). Customer satisfaction: A supportive work environment and its financial cost. *Human Resource Planning*, 14(2), 117-127.
- Willingham, F. (1990). *The development and validation of an instrument to measure selected support staff perceptions of school climate*. Doctoral dissertation, Iowa State University, Ames.
- Wobbekind, R. L., & Graves, P. E. (1989). International student demand for higher education in the United States, *Research in Higher Education*, 39(3), 273-299.
- Yamane, J. M., & Loopo, L. P. (1994). Facilities services department at Colorado State University. In G. L. Reynolds (Ed.), *Building quality: TQM for campus facilities managers*. Alexandria, VA: The Association of Higher Education Facilities Officers.
- Zangwill, W. I. (1994). Ten mistakes CEOs make about quality. *Quality Progress*, 27(6), 43-48.

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